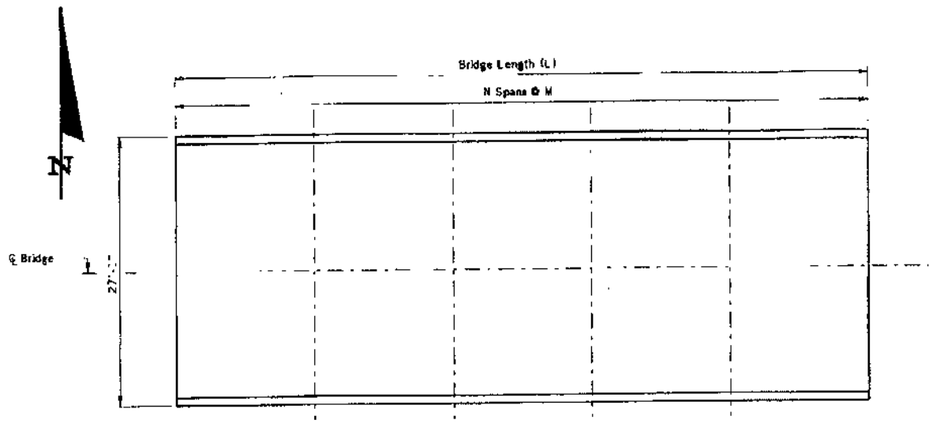
## 5.7 EVALUATION OF ALTERNATIVES

Several considerations are made in the evaluation of project alternatives and options. First, each alternative must achieve the project goal. Each alternative is evaluated to determine how well the project objectives are met through performance measures developed for each objective. In evaluating the effects of alternatives a comparison of the future with a given alternative is compared to the future without condition, or no-action alternative.

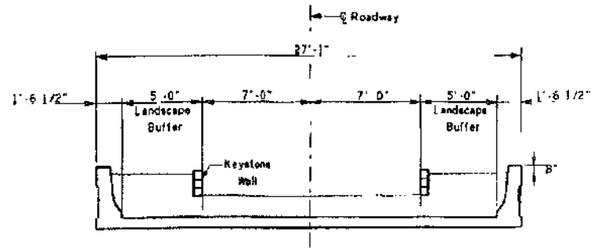
Performance measures such as those developed for this study fall into several broad categories: the alternative's feasibility; beneficial effects of the alternative; and adverse social, economic, and/or environmental impacts that may result. They help the planning team determine how well alternatives meet goals and objectives and how well they stay within constraints and limitations. Table 10 summarizes in matrix format the performance of each alternative with the respect to the performance measures associated with each planning objective.

Cost is another important evaluation criterion. Average annual costs were developed for each of the alternatives and for the no-action alternative. Average annual costs for the no-action alternative are the higher maintenance costs for Tamiami Trail resulting from implementation of the Mod-Waters Project without associated corrective actions to Tamiami Trail. These costs included the higher maintenance costs of Tamiami Trail associated with higher water levels that would result from Mod-Waters. The costs were developed based on damages to the roadway expected to occur as a result of the higher water surface elevations and the expected probability of their occurrence. Total average annual costs under the no-action alternative are $3.3 million. This figure was not included in Table 31(see Page 200) because no-action was never considered to be a realistic alternative for implementation.



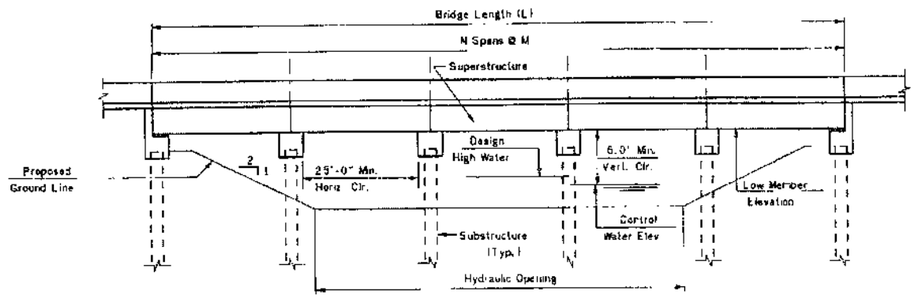

BRIDGE PLAN

Canal Crossing




BRIDGE TYPICAL SECTION

Wildlife Canal Crossing




BRIDGE ELEVATION

Canal Crossing

| Bridge Length (L) | Hydraulic Opening | Number of Spans (N) | Span Lengths (M) | Superstructure Type | Superstructure Type | Design High Water | Control Water Elev. | Low Member Elevation |
|---|---|---|---|---|---|---|---|---|
| 168.75' | N/A | 5 | 33.75 | AASHTO Type II | 18 in. Prestressed Pile | 10.5' | 8.5' | 14.5' |
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BRIDGE DATA

# WILDLIFE CANAL CROSSING BRIDGE DETAILS

General Reevaluation Report/ Supplemental Environmental Impact Statement, Tamiami Trail
Modified Water Deliveries To Everglades National Park, Florida

GEC

Figure: 27

Date: June 2001

Source: PBS&J

Finally, all Corps water resources project alternatives must be evaluated with respect to: 1) acceptability; 2) completeness; 3) effectiveness; and 4) efficiency. Ecosystem restoration project alternatives are also evaluated on the basis of cost-effectiveness and incremental cost analysis. Ecosystem restoration benefits are evaluated on their significance. Other evaluation criteria important in the present study are environmental and socioeconomic effects, wetland impacts, air quality and noise impacts and recreation.

**Performance of Alternatives**

All alternatives were evaluated with respect to how well they met performance measures for each objective. Following is a brief summary of alternative performance. Table 10 presents a summary evaluation matrix.

**Objective 1: Maximize Compatibility for Future CERP Actions**. All alternatives provided some degree of compatibility for future CERP actions. Almost all provided flexibility for increased flows, stages and capacity and did so with fairly minimal retrofitting required. However, alternatives displayed differences in the degree of sheet flow and ecological connectivity they would allow. With the exception of Alternative 5c, no alternative would provide more than partial ecological connectivity. Alternatives 5b and 5c best met objective 1. Alternative 1 and 'No Action' achieved the least with respect to Objective 1.

**Objective 2: Minimize Construction Impacts.** All alternatives performed well with respect to ability to meet MWD implementation schedule, turbidity control and ability to maintain adequate distance from snail kite nesting locations. Alternatives differed in duration of construction (from 18-48 months), although most were in 24-30 month range. Only Alternatives 1 and 2 would not allow for phasing of construction to avoid impacts to wood storks during nesting season. All alternatives would partially meet ability to maintain adequate distances from construction to wood stork primary and secondary wood stork zones. Alternatives varied widely in their temporary impacts to Miccosuckee Tribe and businesses. Alternatives 2a and 2b, 4a and 4b, 7a and 7b, and 8a appeared to best meet Objective 2.

**Objective 3: Minimize Adverse Socioeconomic Impacts**. All alternatives would have at least a minimal impact on one or more socioeconomic factors. Alternatives 3a and 3b and 4a and 4b would have the most impacts, particularly on noise and access to and privacy at Tigertail Camp and Osceola Camp. Alternatives 1 and 7a appeared to fully meet this objective.

**Objective 4: Restore Ecological Function**. All action alternatives, with the exception of 5a, 5b and 5c would result in some wetland functional unit lost in the project area. Alternatives 7a and 8a would result in the least, and alternative 4b would result in the most. All would increase linear footage of ecological connectivity over the no action plan, with alternative 5c increasing it by far the most. There is great variation in degree to which alternatives would provide hydrologic restoration of NESRS, the area in which flow magnitude would be affected and the difference in velocity on either side of Tamiami Trail. Alternative 5c appears to best meet this objective, while alternatives 5a and 5b, and alternatives 6a and 6b perform fairly well.

**Objective 5: Minimize Impacts to Recreation Facilities.** All alternatives would fully provide access to fishing in L-29 canal and boating access to WCA-3b. They vary in temporary access restrictions-from 18 months under alternative 1 to 48 months for alternatives 5a, 5b and 5c. Alternatives 3 through 6 would partially restrict visitor use access, and alternatives 5a, 5b and 5c would only provide minimal access to fishing from Tamiami Trail. Of the action alternatives, alternative 1 would have the least impacts to recreation facilities and alternatives 5a, 5b and 5c would have the most.

**Objective 6: Minimize Permanent/Temporary Loss of Wetlands.** Alternatives 4b, 2b, 7b and 8b would all result in relatively high permanent loss of wetlands in the project area. Alternatives 1, 5a, 5b and 5c would result in no permanent loss of wetlands in the project area. With the exception of alternatives 1, 2a and 2b, most would have minimal temporary loss of wetlands during construction.

**Objective 7: Formulate a Cost-Effective Plan within ENP's Budget.** Refer to cost effectiveness analysis in Section 5.8.1 for a discussion of which alternatives are cost effective. Alternative 1 would have lowest overall costs, while alternative 5c would have the highest overall costs (5a and 5b would be close to 5c). The same pattern holds for most individual performance measures with the exception of recurring maintenance (resurfacing). Alternatives 2b, 3a and 3b would have the highest recurring maintenance costs, while alternatives 5a, 5b and 5c would have the lowest.

**Objective 8: Minimize Impact to the L-29 Canal.** All alternatives would have minimal impact on L-29 canal capacity. All alternatives but 3a and 3b would have minimal effects on fish and wildlife in the L-29 canal.

### 5.7.1 Environmental Effects of Alternatives

#### 5.7.1.1 Geology and Soils

**No-Action Alternative.** No effects on geology or soils would result from the no-action alternative.

**Action Alternatives.** Although various alternatives involve the movement of soils and drilling or making shallow excavations into the limestone bedrock, none of the action alternatives is anticipated to affect either the geological conditions or the soils along the Tamiami Trail. There are no prime or unique farmlands in the project impact area. The project construction area is wholly confined to the existing right-of-way for the highway, and all contiguous lands are dedicated to preservation/conservation. As such there are no prime or unique farmlands within the project impact area.

#### 5.7.1.2 Water Management

The MWD program, of which this project is a component, would provide for structural modifications to the C&SF Project to enable the restoration of more natural water flows to NESRS in ENP. The action alternatives were designed to facilitate the passage of the required volumes of water from the L-29 Canal to help reestablish a more natural distribution of water from WCA-3A and 3B to ENP.

**No-Action Alternative.** Under the no-action alternative, occasional constraints on water management operations may be necessary. Overtopping of the highway during high water events may potentially affect public safety and the needs of ENP. During periods of high water, it may occasionally be necessary to restrict water levels in the L-29 Canal to prevent flooding of the highway. Such restrictions, however, would not meet the purpose of the MWD project.

**Action Alternatives.** The four bridges associated with alternatives 1, 2, and 4, and the breaches in the existing embankment with alternatives 3,and 5 each provide equivalent hydraulic capacity (ca. 1,450 feet total combined width of open area). The breaches in the existing embankment associated with Alternative 6 would provide approximately 1,500 of open area. Alternative 7 involves the removal of the existing Tamiami Trail embankment adjacent to the bridge; this would provide approximately 3,000 linear feet of open area for hydraulic passage. Alternative 8a involves the installation of approximately 24 ten-foot-wide box culverts throughout the length of the corridor; Alternative 8b includes 40 ten-foot-wide culverts. The existing culvert system, which extends along the length of the Tamiami

Trail in the project area, currently provides a general equalization of flows to ENP that approximates sheet flow. Although the bridges, breaches, or box culverts would be capable of conveying the required amount of water, the retention of the existing culvert system would assist in maintaining sheet flow. Alternatives 2b, 4, 6b, 7b, and 8b would result in the loss of the existing culvert system.

#### 5.7.1.3 Water Quality

The MWD Project would result in increased stages and flows in the NESRS from water released from WCA-3A and 3B. Pump Station S-9 discharges urban runoff from the western C-11 basin (Broward County) into the north end of WCA-3A. These waters eventually pass through WCA-3B to ENP through the Structures 12 a, b ,c, and d. Features of the MWD project would restore natural water flow patterns from WCA-3A through WCA-3B to ENP. WCA-3B has had received only direct rainfall for many years, and concern exists about potential adverse impacts if water quality in WCA-3A is not improved prior to restoring flow WCA-3B. Water quality was not a project purpose when the MWD Project was authorized; this issue was not addressed in the MWD GDM in 1992.

**No-Action Alternative.** The 1992 GDM states that agricultural and urban areas elsewhere in the watershed, particularly the Everglades Agricultural Area south of Lake Okeechobee, are expected to continue to influence water quality in the study area and in ENP if no further action is taken. Major ion, color, and iron concentrations should continue to increase until they reach equilibrium primarily by the physical process of dispersion and dilution from rainfall and sheet flow. If inflow from the Everglades Agricultural Area is kept at the present level or greater, increases in nitrogen and phosphorus concentrations at the northern points of inflow to ENP would likely increase. In addition, depending on the volume and the rate of flow from the pumping stations, sediments and bottom material potentially contaminated with metals and pesticides would migrate slowly southward through the WCA canals. Highway runoff from the Tamiami Trail, because of low traffic volume, would be a minor source of metals and nutrients.

**Action Alternatives**. The alternatives studied by the Corps would not increase road capacity or cause increased traffic on the road. Thus, no alternative discussed in this report would cause increased pollutant discharge into adjoining wetlands. The status of the adjacent lands (Everglades National Park property to the south of the roadway, an Outstanding Florida Water [OFW]) was also considered by the Corps. The Corps does not believe any of the alternatives that have been considered would cause additional loading of the above-mentioned pollutants and therefore would not contribute in any way to degradation of the park.

Alternatives that included bridging would allow for either: (1) degrading the existing roadway embankment; or (2) conversion of the old right-of-way to water quality treatment areas. The consensus of the planning team is that restoration to natural wetlands is a more beneficial use that conversion of the same lands to water treatment areas, in light of the information provided in the preceding paragraph. An elevated stormwater treatment area would still constitute a barrier or impediment to restoration of ecological connections between lands and wetlands to the north and those to the south. The Corps, upon review of the contractor's study, concludes that it would be more beneficial to the ecosystem as a whole to allow any road system that is bypassed, and is

not needed to maintain access for existing residents or recreational users, to be restored to natural elevations. Restoration of the bypassed roadway sections would encourage wetland restoration, enhance ecological connectivity, and be more aesthetically pleasing.

Except for temporary adverse impacts associated with construction, none of the alternatives would directly affect surface water quality of the L-29 Canal or ENP. Because adverse effects associated with highway runoff are related to the amount of traffic using the highway, and because none of the alternatives would affect traffic along the Tamiami Trail, no net adverse effects on the Everglades environment would result from this project.

The construction of facilities for the treatment of highway runoff would reduce contaminant levels. However, because traffic volumes on the Tamiami Trail are low, the pollutant loadings along the highway are also low. The acres of Everglades wetlands required to incorporate treatment facilities and differences in cost for constructing water treatment facilities are presented in Table 13. The high costs, both monetarily and ecologically, to further reduce already low contaminant levels must be weighed against the benefits.

**Table 13. Comparison of Acres of Wetlands Permanently Lost and Construction Costs of Each Alternative**

| Alternative | Acres of Wetlands Lost | Construction Cost |
|---|---|---|
| 2a (Without WQ Treatment) | 11.8 | $24,354,65 |
| 2b (With WQ Treatment) | 86.0 | $58,550,65 |
| | Difference 74.2 acres | Difference $34,196,00 |
| 3a (Without WQ Treatment) | 14.3 | $67,959,31 |
| 3b (With WQ Treatment) | 28.9 | $73,457,36 |
| | Difference 15.5 acres | Difference $ 5,498,05 |
| 4a (Without WQ Treatment) | 68.4 | $45,235,11 |
| 4b (With WQ Treatment) | 103.9 | $47,128,43 |
| | Difference 35.5 acres | Difference $ 1,893,32 |
| 5a (Without WQ Treatment) | | $135,915,00 |
| 5b (With WQ Treatment) | N/A | $140,314,00 |
| | | Difference $ 4,399,00 |
| 6a (Without WQ Treatment) | 2.8 | $72,877,97 |
| 6b (With WQ Treatment) | 48.9 | $81,369,67 |
| | Difference 46.1 acres | Difference $ 8,491,69 |
| 7a (Without WQ Treatment) | 5.0 | $23,045,73 |
| 7b (With WQ Treatment) | 72.4 | $51,858,38 |
| | Difference 67.4 acres | Difference $28,812,65 |
| 8a (Without WQ Treatment) | 5.1 | $45,499,99 |
| 8b (With WQ Treatment) | 68.0 | $47,081,02 |
| | Difference 62.9 acres | Difference $ 1,581,03 |

Source: PBS&J and GEC, 2001

An independent assessment and position paper on water quality treatment in south Florida associated with highway and bridge construction is shown in Appendix F.

None of the alternatives evaluated would have any direct effect on ground water.

In accordance with laws of the State of Florida, FDEP will not issue Water Quality Certification (WQC) at the end of a feasibility phase study. Application for WQC requires submittal of detailed design drawings, which are prepared during the preconstruction engineering and design (PED) phase. However, the Corps expects a letter from FDEP indicating its willingness to entertain such an application when project plans have been developed to an appropriate level of detail. Because there is an existing WQC for the overall MWD project, the Corps will be seeking a modification of an existing permit.

#### 5.7.1.4 Hazardous, Toxic, or Radioactive Waste (HTRW)

A preliminary assessment indicated that no HTRW or other harmful substances are impacting the project area. However, if contaminants are found during project construction, the site must be remediated before construction resumes.

Contaminants could be disturbed or released by increasing the water level and hydroperiod or by removing unnatural structures from the landscape. Experience has shown that the highly permeable ground substrate in the project area results in rapid dilution of residual contaminants.

#### 5.7.1.5 Environmental Resources

##### 5.7.1.5.1 Everglades National Park.

**No-Action Alternative**. Under the No-Action Alternative, no additional features would be added to the existing roadway for conveyance of flows associated with MWD implementation. The existing Tamiami Trail configuration, although capable of passing the required flows, is subject to saturation of the road base, thereby weakening the roadway, and to overtopping. During periods of high water, desired flows to ENP could potentially be reduced to prevent flooding of the highway and protect public safety.

**Action Alternatives.** All action alternatives would promote the hydrologic restoration of ENP by providing additional passage of MWD flows and enhancing the hydroperiod. All action alternatives meet the design stage performance requirements

##### 5.7.1.5.2 Shark River Slough (SRS) East and West Basins.

**No-Action Alternative.** Under the No-Action Alternative, impacts to the SRS would be similar to those described in Section 5.7.1.5.1 above.

**Action Alternative.** Alternatives 2, 3, 4, 5, 6, 7, and 8 would have the same effect hydrologically on SRS. The bridges of alternatives 2 and 4 and the breaches of Alternatives 3, 5, and 6 would provide equivalent hydraulic openings at the same locations. All action alternatives would convey the desired MWD flows to SRS.

##### 5.7.1.5.3 Water Conservation Area 3B.

**No-Action Alternative.** Under the No-Action Alternative, there would be no impacts to WCA-3B

**Action Alternatives.** All alternatives except Alternative3 are located south of the L-29 Canal and would have no impacts on WCA-3B. The Alternative 3 alignment to the north

of the L-29 levee encroaches into WCA-3B in some areas resulting in a loss of 14.3 (Alternative 3a) or 30.15 (Alternative 3b) acres of wetlands. Prolonged inundation in WCA-3B would be reduced because the bridges and weirs would allow water to flow from WCA-3B into the L-29 Canal.

**5.7.1.5.4 Biological Communities.**

**No-Action Alternative.** Under the No-Action Alternative, biological communities near the project are expected to be generally unaffected. A potential effect would occur if increased head height in the L-29 Canal resulting from increased flows were to overtop the road, creating a motoring safety hazard. Under these conditions, flows may be reduced to lower head height in the canal, thereby limiting restoration of more natural hydrologic conditions to ENP. Flow restrictions would create barriers to the free movement of organisms, particularly those with limited mobility, such as aquatic organisms (fishes, invertebrates, etc.), and ecological connectivity between the L-29 Canal and ENP would remain limited.

Vehicle collisions along the Tamiami Trail have been shown to be a major cause of wildlife mortality in the Everglades. Under the No-Action Alternative, no measures to reduce wildlife mortality would be employed within the project area.

The FHWA has provided policy and guidance on addressing the issue of wildlife mortality (FHWA Final Guidance, Transportation Enhancement Activities, 23 U.S.C. AND TEA-21). This program is not limited to threatened and endangered species, but includes any wildlife mortality directly caused by vehicles. States are charged to recognize and develop a statement of purpose and need for such projects. The criteria used to determine a need for a wildlife crossing or control project in a specific location are determined based on migration patterns, habitat use and distribution, and crossing characteristics of the wildlife through data collection on safety of motorists, habitat fragmentation, and wildlife mortality.

**Action Alternatives.** All action alternatives would increase ecological connectivity. Connectivity between the L-29 Canal and ENP provided by the four bridges in alternatives 1, 2, and 4 would increase the combined hydraulic opening to 1,450 linear feet, providing partial connectivity between ENP and the L-29 Canal. Alternatives 3 and 5 would also provide ecological connectivity by abandoning the existing road (except for access to the Osceola Camp and the Airboat Association of Florida) and breaching it to provide hydraulic openings equal to those provided by the bridges of alternatives 1, 2, and 4. Alternatives 5c (56,496 linear feet), 6 (1,500 linear feet), and 7 (3,000 linear feet)would provide greater connetivity. Alternative 8a would provide sufficient hydraulic capacity for MWD flows through 24 10-foot-wide box culverts throughout the length of the project corridor; Alternative 8b would provide 40 10-foot-wide box culverts.

If, in the future, it becomes desirable to restore ecological connectivity between WCA-3B and ENP through the removal of the L-29 Levee and the filling of the L-29 Canal, the degree of connectivity provided for the Tamiami Trail by alternatives 1, 2, 3, and 4 would be limited to the hydraulic openings of the bridges or breaches. The hydraulic capacity of Alternative 8 would be limited to culverts.

There are no specific provisions made to reduce wildlife mortality, although the bridge spans of the various alternatives would likely provide some reduction in mortality of

wildlife crossing the Tamiami Trail. Alternatives 2 and 4 offer a combined span of 1,450 feet, while alternatives 6 and 7 provide four miles and 3,000 feet, respectively. Alternative 3 offers no additional structures that would decrease wildlife mortality. Alternative 5 would elevate traffic and virtually eliminate wildlife mortality in the project area. All alternatives provide options for incorporating corridors and barriers to enable wildlife to safely cross the highway and the L-29 Canal.

#### 5.7.1.5.5 Wetlands.

**No-Action Alternative**. Under the No-Action Alternative, no impacts to wetlands associated with construction activities would occur. However, project restoration goals would not be achieved.

**Action Alternatives.** Potential impacts to wetlands for each of the alternatives were quantified using the WRAP (Wetland Rapid Assessment Procedure) protocol (WRAP Procedure, Technical Publication REG-001, Second Edition, April 1999). WRAP assists in the functional evaluation of wetland sites, which can be combined with professional judgment to provide an accurate and consistent evaluation of wetland sites. The WRAP process establishes a numerical score for a site based on ecological and anthropogenic variables. The acreage of each wetland habitat type is then multiplied by the WRAP score for that site to derive "functional units" for comparison purposes.

Fieldwork for the WRAP to determine existing conditions was performed in November and December 2000. The results of the existing condition WRAP are presented in Table 14. The "future with project" analysis was performed on January 31 and February 1, 2000. A complete discussion of the WRAP procedure is included in the USFWS CAR (Appendix G); the results are summarized in this section.

**Table 14. Existing Condition WRAP Wetland Functional Scores for 11 Wetland Polygons on the North (WCA-3B) and South (ENP) Sides of the Eastern 11-Mile Section of Tamiami Trail (November 14-15 and December 19, 2000)**

| Water Conservation Area 3B | | | Everglades National Park | | |
|---|---|---|---|---|---|
| Site | Coordinates | Score | Site | Coordinates | Score |
| 1-3B (PC/PGc) | 547546<br>2849389 | 0.68 | 1-ENP (PGc/PGw) | 532858<br>2849250 | 0.70 |
| 2-3B (PE) | 574280<br>2849386 | 0.80 | 2-ENP (SB) | 541784<br>2849272 | 0.69 |
| 3-3B (PGc/PGw) | 546090<br>2849372 | 0.78 | 3-ENP (SB) | 545591<br>2849287 | 0.69 |
| 4-3B (SBa/SBs) | 541983<br>2849359 | 0.83 | 4-ENP (PC) | 550370<br>2849489 | 0.48 |
| 5-3B (PGw) | 540538<br>2849358 | 0.83 | 5-ENP (ES/SB) | 549707<br>2849308 | 0.54 |
| 6-3B (PC) | 535733<br>2849341 | 0.53 | | | |

Source: WRAP Team, 2000.

On average, existing condition WRAP scores were slightly higher in the wetland areas north of the L-29 Levee (WCA-3B) than wetland areas south of the Tamiami Trail (ENP).

The consensus among WRAP team members was that the lower scores within ENP were primarily due to the proximity of the ENP wetlands to the road, being the recipient of highway runoff, and the general lack of a minimum 30-foot buffer between the highway and the wetlands. Except for those wetlands fringing the highway and those wetlands dominated by nuisance and exotic vegetation, the quality of wetlands in the project area is generally good.

Impacts were determined for each alternative for both a with-water-quality and a without-water-quality treatment scenario. All water quality treatment options discussed in Section 5.5.6.19 were evaluated for each alternative. The water quality treatment options are designated by the following abbreviations in the summary discussion below:

- b = Standard water quality treatment as originally proposed;
- b1 = Water Quality Treatment Option 1A;
- b2 = Water Quality Treatment Option 1B;
- b3 = Water Quality Treatment Option 1C;
- b4 = Water Quality Treatment Option with grass strips;
- b5 = Exfiltration trenches with curbs and gutters;
- b6 = Exfiltration trenches with shoulder gutter.

For example, "WRAP Alternative 2b3" would correspond to Alternative 2b with highway runoff being treated through Water Quality Treatment Option 1-C.

Table 14 presents WRAP scores for each of the different wetland habitat types in the project area. Scores are based on numerous ecological variables.

Table 15 contains the overall wetland functional units associated with each alternative and water quality scenario. Also included in the WRAP were areas that could be potentially restored in ENP. Although potential restoration is not currently included in each alternative, restoration sites were identified for use in future projects.

Based on the WRAP wetland functional assessment, Alternative 4b (Alternative 4 with dry retention water quality treatment) would cause the largest wetland functional losses (- 64.64 FU) within the constructed footprint, and Alternative 5c (elevated causeway with full restoration of existing US 41) would provide the most significant wetland functional gains (+ 45.27 FU) within the project foot print itself. The ranking of all alternatives (most to least impacts) from a wetland functional loss/gain perspective only is displayed in Table 16. This table reflects the consensus ranking of the WRAP assessment team, and compared only direct construction effects along Tamiami Trail. This WRAP assessment did not consider the "lift" to be gained by restoring stages and flows inside ENP, south of Tamiami Trail, which is the primary goal of the Modified Water Deliveries Project, and this study.

In comparison to the very large area of Northeast Shark River Slough that would benefit from achievement of peak flows, across Tamiami Trail, of up to 4,000 cfs, the modest wetlands losses/gains shown under the various alignment/treatment alternatives are considered inconsequential. ENP was authorized to acquire up to 105,000 acres of lands in northeast Shark Slough by the Everglades Expansion and Protection Act of 1989. These are the lands that would largely be rehydrated under the MWD project,

and ultimately under the Decompartmentalization and large flow regime authorized in the Comprehensive Everglades Restoration Project (CERP).

**Table 15. Summary of With-Project Wetland Rapid Assessment Procedures (WRAP) Functional Units (FU) Lost within the project footprint Different Water Quality Scenarios, Tamiami Trail Project, Modified Water Deliveries Project With Different Water Quality Treatment Scenarios**

| Alternative 2 (Existing Alignment) | | | |
|---|---|---|---|
| **Alternative** | **Direct Effects (FU)** | **Indirect Effects (FU)** | **Total Functional Unit Lost** |
| 2a – w/o WQ Treatment | 7.18 | 2.92 | 10.10 |
| 2b* – w/ WQ Treatment | 34.55 | 2.92 | 37.48 |
| 2b1* – w/ WQ Treatment | 30.70 | 2.92 | 33.62 |
| 2b2* – w/ WQ Treatment | 5.45 | 2.92 | 8.37 |
| 2b3* – w/ WQ Treatment | 5.45 | 2.92 | 8.37 |
| 2b4* – w/ WQ Treatment | 5.45 | 2.92 | 8.37 |
| 2b5* – w/ WQ Treatment | 5.45 | 2.92 | 8.37 |
| 2b6* – w/ WQ Treatment | 5.42 | 2.92 | 8.34 |
| **Alternative 3 (North Alignment)** | | | |
| **Alternative** | **Direct Effects (FU)** | **Indirect Effects (FU)** | **Total Functional Unit Lost** |
| 3a – w/o WQ Treatment | 11.06 | 7.76 | 18.82 |
| 3b* – w/ WQ Treatment | 22.39 | 7.76 | 30.15 |
| 3b1* – w/ WQ Treatment | 17.64 | 7.76 | 25.50 |
| 3b2* – w/ WQ Treatment | 8.24 | 7.76 | 16.00 |
| 3b3* – w/ WQ Treatment | 10.48 | 7.76 | 18.24 |
| 3b4* – w/ WQ Treatment | 7.43 | 7.76 | 15.191 |
| 3b5* – w/ WQ Treatment | 8.03 | 7.76 | 15.79 |
| 3b6* – w/ WQ Treatment | 8.10 | 7.76 | 15.86 |
| **Alternative 4 (South Alignment)** | | | |
| **Alternative** | **Direct Effects (FU)** | **Indirect Effects (FU)** | **Total Functional Unit Lost** |
| 4a – w/o WQ Treatment | 46.86 | +6.43 | 40.43 |
| 4b* – w/ WQ Treatment | 71.07 | +6.43 | 64.64 |
| 4b1* – w/ WQ Treatment | 42.91 | +6.43 | 36.49 |
| 4b3* – w/ WQ Treatment | 42.92 | +6.43 | 36.49 |
| 4b4* – w/ WQ Treatment | 42.03 | +6.43 | 35.60 |
| 4b5* – w/ WQ Treatment | 42.94 | +6.43 | 36.51 |
| 4b6* – w/ WQ Treatment | 42.92 | +6.43 | 36.49 |
| **Alternative 5 (Elevated Causeway)** | | | |
| **Alternative** | | **Acres Restored** | **Functional Units Gained** |
| 5a – w/o WQ Treatment; w/ a Berm | | 57.3 | 39.35 |
| 5b – w/ WQ Treatment; w/ a Berm | | 43.0 | 29.54 |
| 5c – w/o WQ Treatment; w/o a Berm | | 65.9 | 45.27 |
| 5d – w/ WQ Treatment; w/o a Berm | | 49.4 | 33.93 |

**Table 15 (cont'd). Summary of With-Project Wetland Rapid Assessment Procedures (WRAP) Functional Units (FU) Lost within the project footprint Different Water Quality Scenarios, Tamiami Trail Project, Modified Water Deliveries Project With Different Water Quality Treatment Scenarios**

| Alternative 6 (Four-Mile Bridge) | | | |
|---|---|---|---|
| **Alternative** | **Direct Effects (FU)** | **Indirect Effects (FU)** | **Total Functional Unit Lost** |
| 6a – w/o WQ Treatment | 2.26 | 0 | 2.26 |
| 6b* – w/ WQ Treatment | 35.46 | 0 | 35.46 |
| 6b1* – w/ WQ Treatment | 5.29 | 0 | 5.29 |
| 6b2* – w/ WQ Treatment | 2.28 | 0 | 2.28 |
| 6b3* – w/ WQ Treatment | 5.29 | 0 | 5.29 |
| 6b4* – w/ WQ Treatment | 5.29 | 0 | 5.29 |
| 6b5* – w/ WQ Treatment | 2.28 | 0 | 2.28 |
| 6b6* – w/ WQ Treatment | 2.28 | 0 | 2.28 |
| **Alternative 7 (3,000-Foot Bridge)** | | | |
| **Alternative** | **Direct Effects (FU)** | **Indirect Effects (FU)** | **Total Functional Unit Lost** |
| 7a – w/o WQ Treatment | 3.42 | 0 | 3.42 |
| 7b* – w/ WQ Treatment | 49.55 | 0 | 49.55 |
| 7b1* – w/ WQ Treatment | 7.18 | 0 | 7.18 |
| 7b2* – w/ WQ Treatment | 3.42 | 0 | 3.42 |
| 7b3* – w/ WQ Treatment | 7.18 | 0 | 7.18 |
| 7b4* – w/ WQ Treatment | 7.18 | 0 | 7.18 |
| 7b5* – w/ WQ Treatment | 3.42 | 0 | 3.42 |
| 7b6* – w/ WQ Treatment | 3.42 | 0 | 3.42 |
| **Alternative 8 (Box Culverts)** | | | |
| **Alternative** | **Direct Effects (FU)** | **Indirect Effects (FU)** | **Total Functional Unit Lost** |
| 8a – w/o WQ Treatment | 3.51 | 0 | 3.51 |
| 8b* – w/ WQ Treatment | 46.56 | 0 | 46.56 |
| 8b1* – w/ WQ Treatment | 7.48 | 0 | 7.48 |
| 8b2* – w/ WQ Treatment | 3.51 | 0 | 3.51 |
| 8b3* – w/ WQ Treatment | 7.48 | 0 | 7.48 |
| 8b4* – w/ WQ Treatment | 7.48 | 0 | 7.48 |
| 8b5* – w/ WQ Treatment | 3.51 | 0 | 3.51 |
| 8b6* – w/ WQ Treatment | 3.51 | 0 | 3.51 |

*For each alternative with water quality, the following treatment option corresponds with each alternative: b=standard water quality treatment (originally proposed); b1=Option 1A; b2=Option 1B; b3=Option 1C; b4=Option with grass strips; b5=exfiltration trenches with curbs and gutters; b6=exfiltration trenches with shoulder gutter.

Source: WRAP Team, 2001.

**Table 16. Rankings of Tamiami Trail Project Alternatives (With and Without Water Quality Treatment) Based on Losses/Gains of Wetland Functional Units**

| Ranking of Alternatives W/o WQ Treatment ( 1 = best) | | | Ranking of Alternatives w/ WQ Treatment (1 = best) | | |
|---|---|---|---|---|---|
| Rank | Alternative | Functional Units | Rank | Alternative | Functional Units |
| 1 | 5c | +45.27 | 1 | 5d | +33.93 |
| 2 | 5a | +39.35 | 2 | 5b | +29.54 |
| 3 | 7a | -1.93 | 3 | 6b2, 6b5 | -3.34 |
| 4 | 1 | -2.92 | 4 | 7b2, 7b5, 7b6 | -3.42 |
| 5 | 8a | -3.42 | 5 | 8b2, 8b5, 8b6 | -3.51 |
| 6 | 6a | --6.60 | 6 | 6b6 | -3.54 |
| 7 | 2a | -11.10 | 7 | 7b1, 7b3, 7b4 | -7.18 |
| 8 | 3a | -18.82 | 8 | 8b1, 8b3, 8b4 | -7.47 |
| 9 | 4a | -40.43 | 9 | 2b6 | -8.34 |
| | | | 10 | 2b2, 2b5 | -8.87 |
| | | | 11 | 3b6 | --15.86 |
| | | | 12 | 3b5 | -15.79 |
| | | | 13 | 3b4 | -15.91 |
| | | | 14 | 3b2 | -16.00 |
| | | | 15 | 3b3 | -18.24 |
| | | | 16 | 6b1 | -20.87 |
| | | | 17 | 6b | -22.77 |
| | | | 18 | 3b1 | -25.40 |
| | | | 19 | 3b | -30.15 |
| | | | 20 | 2b1 | -33.62 |
| | | | 21 | 4b4 | -35.6 |
| | | | 22 | 4b1, 4b3, 4b6 | -36.49 |
| | | | 23 | 4b5 | --36.51 |
| | | | 24 | 4b2 | -36.52 |
| | | | 25 | 2b | -37.48 |
| | | | 26 | 4b | --64.64 |

Source: WRAP Team, 2001.

Based on the ranking of total wetland functional units lost/gained by each alternative without water quality treatment, Alternative 5 (elevated causeway) is the least damaging to wetlands with the remaining alternatives exhibiting a range of impacts (see Table 16). Alternative 1 (existing alignment and profile with four new bridges) has relatively minor wetland functional loss (- 2.92 FU) attributable to temporary bypass roads and no other direct losses.

Under the with water quality treatment scenario, wetland functional losses are increased by slightly over 41 percent (22.79 FU) for all alternatives except for Alternative 5 which shows a decrease in wetland functional gains by 25 percent (a decreased gain of 10.58 FU). The water quality treatment options, as described below, are designed to significantly reduce wetland functional losses, when compared to average FU losses

from the dry retention water quality treatment. Average FU losses decrease by approximately 53 percent (20.68 FU) with revised water quality treatment options.

Water Quality Treatment Option impacts, as shown in Table 16, are summarized below:

**(Water Quality Option 1-A/b1 - Shift Alignment and Compress Swale/South Side):** Compared to dry retention option, Option b1 reduces wetland functional losses by about 25 percent (9.68 FU) on average. For Alternative 4 specifically, Option b1 would reduce wetland functional losses by 28.15 FU, or approximately 54 percent.

**Option b2 (Water Quality Option 1B - Shift Alignment and Compress Swale/North Side):** Compared to Option b (original dry retention), Option b2 would reduce wetland functional losses by about 56 percent (21.71 FU) on average. The most significant wetland functional loss reduction for Option b2 compared to Option b is Alternative 2, where wetland functional loss would be reduced by 78 percent (29.11 FU).

**Option b3 (Water Quality Option 1C - Shift Typical Section North into L-29 Canal):** Compared to Option b (original dry retention), Option b3 would reduce wetland functional losses by 57 percent (22.15 FU) on average. The most significant wetland functional loss reduction for Option b3 compared to Option b is again Alternative 2, where wetland functional loss would be reduced by 78 percent (29.11 FU).

**Option b4 (Grass Strips):** Compared to dry retention, Option b4 would reduce wetland functional losses by 59 percent (22.96 FU) on average. The most significant wetland functional loss reduction compared to dry retention occurs in Alternative 2, with wetland functional loss reduction of 78 percent (29.11 FU).

**Water Quality Option 2/b5 – Exfiltration Trenches with Curb and Gutter:** Compared to dry retention, Option b5 would reduce wetland functional losses by 59 percent (22.76 FU) on average. The most significant wetland functional loss reduction for Option b5 is seen again Alternative 2, showing functional loss reductions of 78 percent (29.11 FU).

**Water Quality Option 3/b6 – Exfiltration Trenches with Shoulder Gutter:** Compared to dry retention, Option b6 would reduce wetland functional losses by 59 percent (22.70 FU) on average. The most significant wetland functional loss reduction for Option b5 occurs again with Alternative 2, showing functional loss reduction of over 78 percent (29.42 FU).

#### 5.7.1.5.6 Threatened or Endangered Species.

**No-Action Alternative.** Environmental resources near the project area and ENP are expected to be generally unaffected under the future without project conditions. Benefits of the MWD project, however, would remain unrealized.

**Action Alternatives. Two wood stork colonies exist near the project area.** The USFWS, using the *Habitat Management Guidelines for the Wood Stork in the Southeast Region* (Guidelines) (Ogden 1990) and Tamiami West Colony photography from the 1999 nesting season, identified a primary and secondary zone for the Tamiami West Colony and the Tamiami East Colony. Based on photo interpretation, it was apparent that wood storks nested as close as 300 feet south of Tamiami Trail during the 2000

nesting season, when an estimated 1,300 storks nested at this site. A description of both the primary and secondary zones follows:

- The Primary Zone is the most critical area, and must be managed according to the Guidelines to insure the colony survives. Human activities inside the Primary Zone during the wood stork nesting season, in particular, should be conducted according to the Guidelines. For the Tamiami East and West colonies, the primary zone extends 1,000 feet on all sides due to the visual barrier the pond apple forest creates between the colony and Tamiami Trail, and the fact that storks appear to have become somewhat acclimated to highway traffic noise.

- The Secondary Zone extends outward from the Primary Zone 1,000 feet. Restrictions in this zone are needed to minimize disturbances that might impact the Primary Zone, and to protect essential areas outside the Primary Zone. The Secondary Zone may be used by wood storks for collecting nesting material, for roosting, loafing, and feeding (especially important for newly fledged young).

Restrictions per individual wood stork colony are as follows:

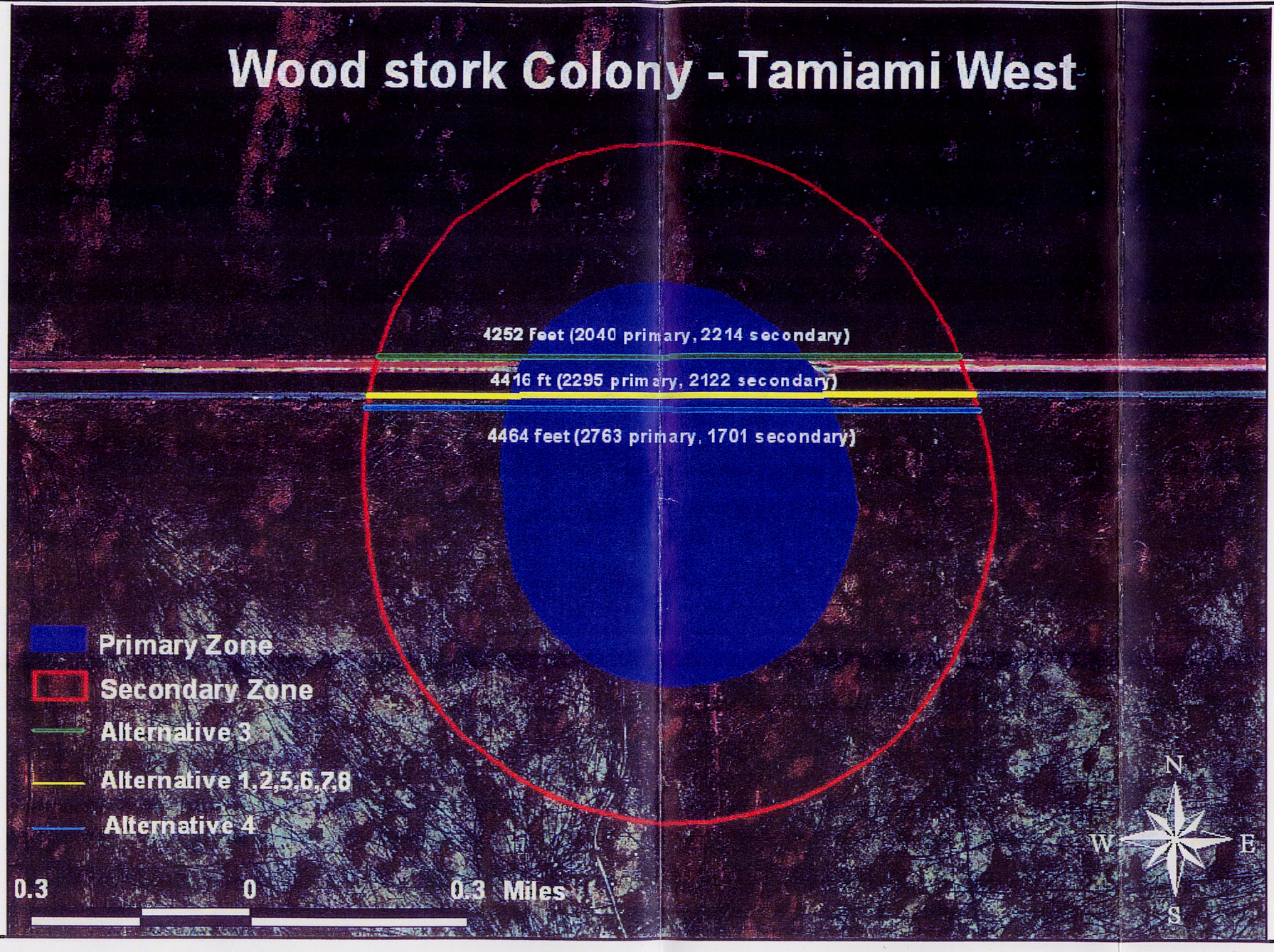
- **Tamiami West** (Figure 28)

  (1) **Primary Zone:** From February (or onset of nesting activity) through the on-set of the rainy season (or when the young have fledged), highway construction *(e.g.* heavy/human equipment activity, pile driving, blasting) should not be permitted in the reach of the highway affected by that alternative.

  (2) **Secondary Zone:** No unauthorized human activity (on foot, airboat, or off-road vehicle) should occur at any time of the year within the reach of highway affected by that alternative on the south side of the highway and particularly during the nesting season.

  (3) **Length of Restrictions:** These restrictions shall remain in effect during the construction phase of the Tamiami Trail Project, which is 18 – 48 months depending on the final alternative selected.

  (4) **Qualified Observer:** Subject to the approval of the USFWS and FFWCC, a qualified observer(s) shall be stationed onsite during the construction phase of the Tamiami Trail Project, which is 18 – 48 months depending on the final alternative selected. The observer shall monitor wood stork activity and shall notify USFWS, FFWCC, and the Corps if wood stork behavior is modified such that roosting, nest building, breeding, nesting, and/or fledging of young is disrupted or otherwise interfered with.




TAMIAMI WEST COLONY

General Reevaluation Report/ Supplemental Environmental Impact Statement, Tamiami Trail
Modified Water Deliveries To Everglades National Park, Florida

GEC
Gulf Engineers & Consultants, Inc.

Figure: 28
Date: March 2001
Source: USFWS, 2001

(5) **Modification of Restrictions:** If new information becomes available concerning the Tamiami West Wood stork colony, the Corps, USFWS and FFWCC should immediately contact each other to determine what modifications, if any, are warranted.

- **Tamiami East** (Figure 29)

(1) **Secondary Zone:** No unauthorized human activity (on foot, airboat, or ORV) should occur at any time of the year within the reach of highway affected by that alternative on the south side of the highway and particularly during the nesting season.

(2) **Length of Restrictions:** These restrictions shall remain in effect during the construction phase of the Tamiami Trail Project, which is 18–48 months depending on the final alternative selected.

(3) **Qualified Observer:** Subject to the approval of the FWS and FFWCC, a qualified observer(s) shall be stationed onsite during the construction phase of the Tamiami Trail Project, which is 18–48 months depending on the final alternative selected. The Observer shall monitor wood stork activity and shall notify USFWS, FFWCC, and the Corps if wood stork behavior is modified such that roosting, nest building, breeding, nesting, and/or fledging of young is disrupted or otherwise interfered with.

(4) **Modification of Restrictions:** If new information becomes available concerning the Tamiami West Wood Stork Colony, the Corps, USFWS, and FFWCC should immediately contact each other to determine what modifications, if any, are warranted.

**Frog City.** This small colony (Figure 30) is situated in WCA-3B close to the L-29 Levee approximately one-quarter mile west of the Tigertail Camp. This small willow head supports nesting by tricolored herons and great egrets. These migratory birds are also protected under the provisions of the Migratory Bird Treaty Act. As such, they are protected species under the jurisdiction of FWS. The FFWCC and USFWS have applied the *Minimum Buffer Zone Requirements to Protect Nesting Bird Colonies from Human Disturbance.* For alternatives 1, 2, 4, 5, 6, 7, and 8, which are all located south of the L-29 Levee/Canal, USFWS and FFWCC did not recommend that any Buffer Zone restrictions be applied to the Frog City Colony. The colony is protected from highway construction noise by the approximately 20-foot high L-29 Levee, and the wading birds nesting at this colony have acclimated to continuous highway traffic and noise. Restrictions for this area apply to Alternative 3 and are as follows:

(1) **Alternative 3 (North alignment in WCA-3B):** It is recommended that Alternative 3 be eliminated from further consideration as a project alternative for the Tamiami Trail Project due to the potential abandonment of the Frog City Colony by the protected species it supports.

**Buffer Zone:** No Buffer Zone restrictions are recommended for the Frog City Colony for alternatives 1, 2, 4, 5, and 6 during the construction phase of the Tamiami Trail Project.

(2) **Qualified Observer:** Subject to the approval of USFWS and FFWCC, a qualified observer(s) shall be stationed onsite during the construction phase of the Tamiami Trail Project, which is 18–48 months depending on the final alternative selected. The observer shall monitor wading bird activity and shall notify USFWS, FFWCC, and the Corps if wading bird behavior is modified such that roosting, nest building, breeding, nesting, and/or fledging of young is disrupted or otherwise interfered with.

(4) **New Information:** If new information becomes available concerning the Frog City Colony, the Corps, USFWS, and FFWCC will together determine what actions, if any, are warranted.

With the application of the above referenced restrictions, alternatives 1, 2, 4, 5, 6, 7, and 8 (with and without water quality treatment) should not adversely impact threatened or endangered species.

Alternative 3 would result in adverse impacts to the Frog City Colony consequently resulting in significant adverse impacts to State listed and Federally protected species.

#### 5.7.1.6 Climate

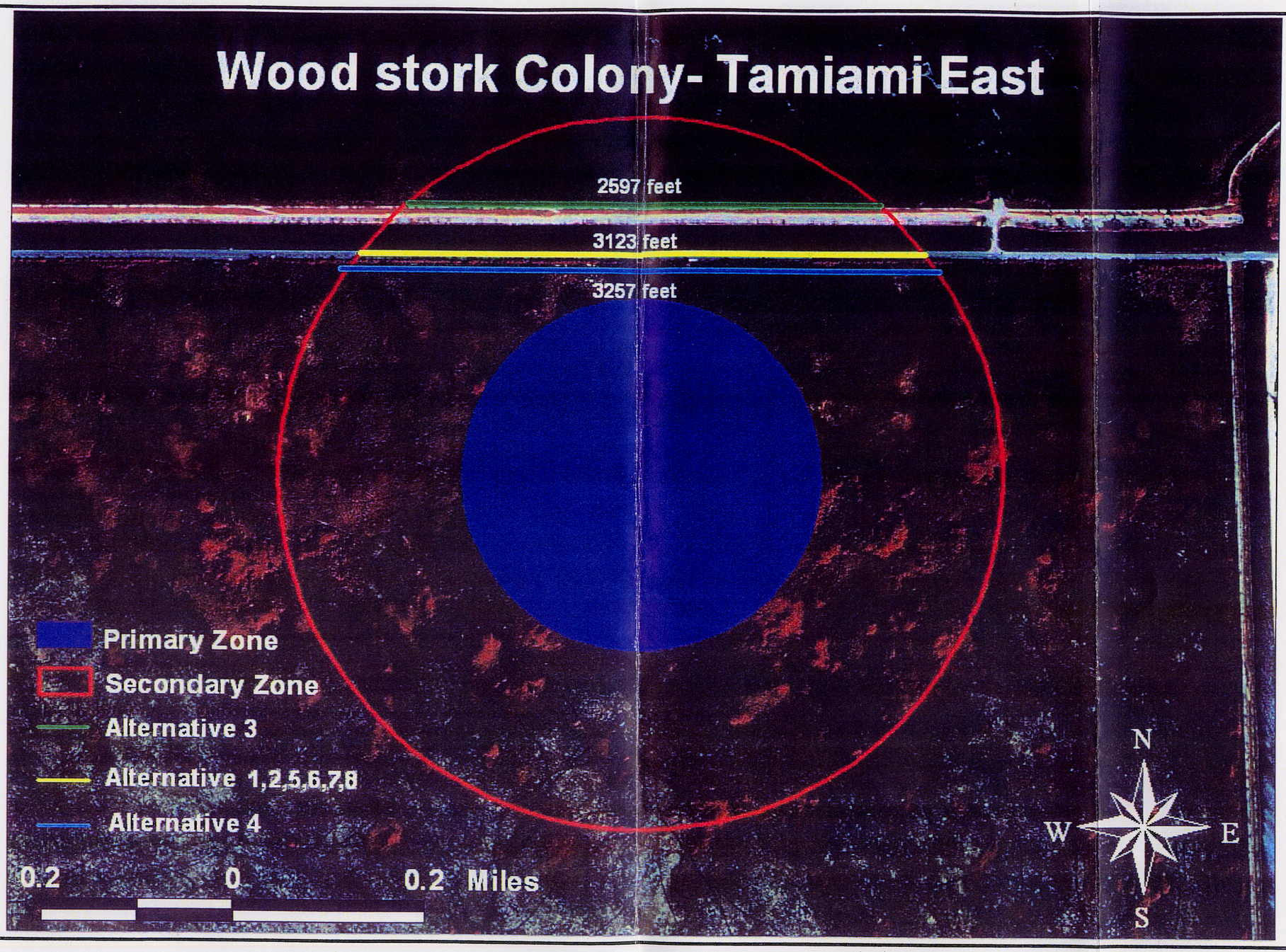
No effect on climate would result with or without implementation of the project.

#### 5.7.1.7 Air Quality

**No-Action Alternative.** The trend in values from existing conditions in 2000 through future without project conditions in 2020 would increase from 4.8 ppm to 5.0 ppm of carbon monoxide at the Osceola Camp (a 4.2 percent increase) and from 4.0 ppm to 4.8 ppm (a 20 percent increase) at the Tigertail Camp. The increased concentrations are due solely to the projected increases in traffic volume. At neither location do the projected increases exceed the NAAQS eight-hour standard of 9.0 ppm.

**Action Alternatives.** Analyses conducted pursuant to project air quality impacts, as well as the organization of the information provided in this section, are in accordance with guidance promulgated in the FDOT Environmental Management Office (EMO) Project Development and Environment Manual (PD&E Manual), Part 2, Chapter 16, Air Quality Analysis. Although the proposed project does not increase traffic volumes, several alternatives involve a relocation of traffic closer to residential areas, thus the necessity that air quality be modeled.

Air quality must be considered from two perspectives in evaluation of alternatives for this project. First is the applicability of transportation conformity, or whether the project is located in an area that is in either nonattainment or maintenance status of a National Ambient Air Quality Standard (NAAQS). The second perspective is the project level carbon monoxide hot spot analysis required for all projects in all geographic areas regardless of attainment status.




TAMIAMI EAST COLONY

General Reevaluation Report/ Supplemental Environmental Impact Statement, Tamiami Trail
Modified Water Deliveries To Everglades National Park, Florida

GEC
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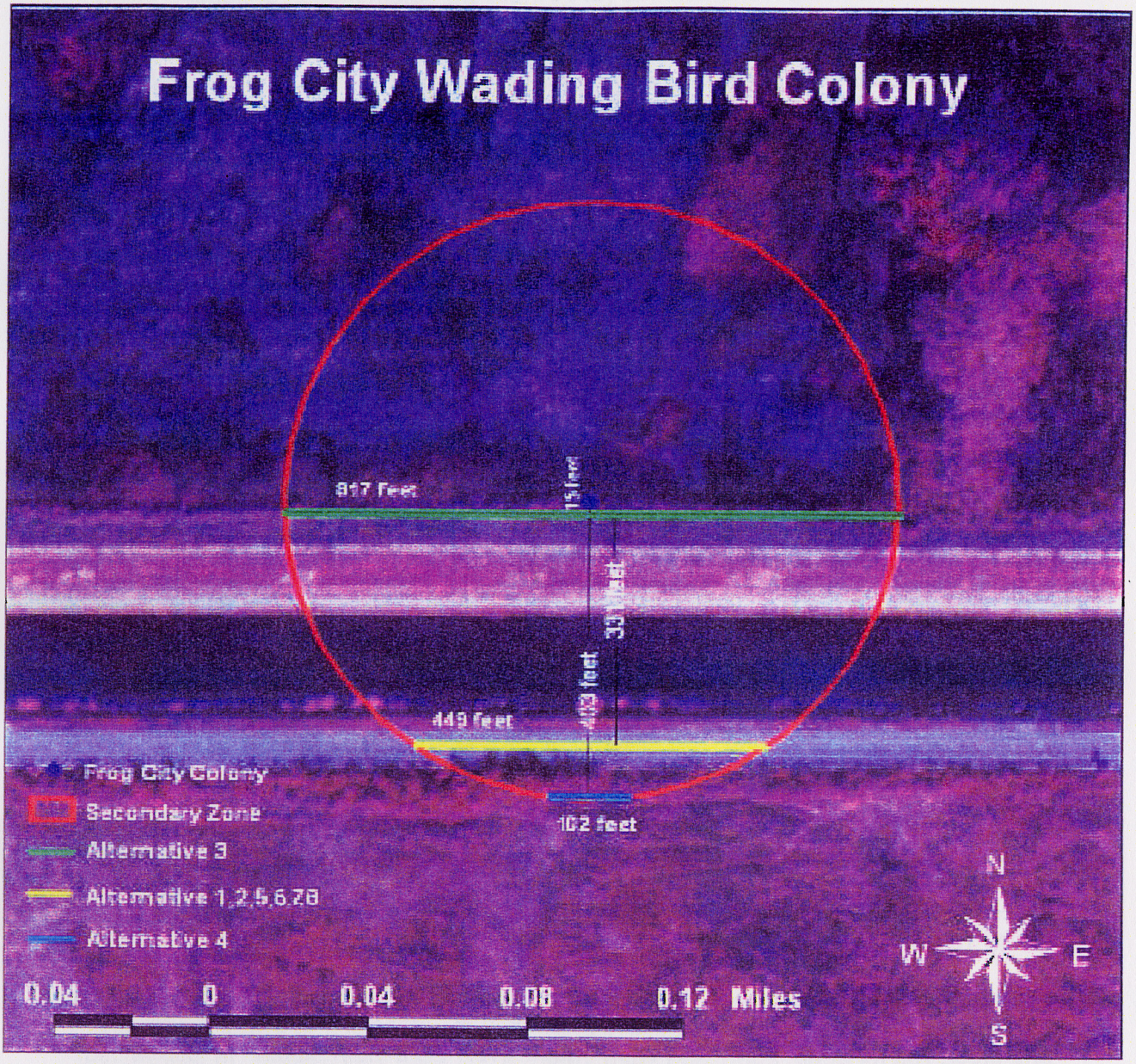
Figure: 29
Date: March 2001
Source: USFWS, 2001




FROG CITY WADING BIRD COLONY

General Reevaluation Report/ Supplemental Environmental Impact Statement,Tamiami Trail
Modified Water Deliveries To Everglades National Park, Florida

GEC
Gulf Engineers & Consultants, Inc.

Figure: 30
Date: March 2001
Source: USFWS

**Transportation Conformity**

The 1990 Clean Air Act Amendments (CAAA),govern determination of transportation conformity (plan, program, and project).

This project does not appear to qualify for a Programmatic or Type I Categorical Exclusion for conformity analysis per FDOT's PD&E Manual, so,an impact analysis of the alternatives was conducted.

In accordance with PD&E Manual Section 16-2.2.2.1, the analysis includes all alternatives currently under consideration, including the no-build alternative. Timeframes for the analysis include 2000 for the existing profile and alignment, 2006 as the first year the project will be open to traffic, and 2020 for the design year.

**Carbon Monoxide Analysis**

An initial screening of potential carbon monoxide (CO) impacts was conducted using COSCREEN software from FDOT's EMO an additional CO, volatile organic carbon (VOC), and oxides of nitrogen ($NO_X$)) analysis, and using EPA's MOBILE5A Mobile Source Emission Factor Model, a program that estimates such emissions for gasoline and diesel-fueled motor vehicles was also conducted. The program uses the calculation procedures presented in Compilation of Air Pollutant Factors – Volume II (AP-42, Fourth Edition, September 1985, and Supplement A to AP-42 Volume II, January 1991).

COSCREEN analyses were conducted for all alternatives using the rural setting and average cruise speed for projected traffic volumes for the projected project implementation date of 2006, a design year of 2020, and, for comparison with existing conditions, 2000. MOBILE5A calculates emission factors for eight individual vehicle types in two regions (low and high altitude) of the country. The emission factor estimates further depend on various conditions such as ambient temperatures, average travel speed, operating modes, fuel volatility, and mileage accrual rates.

In accordance with state and federal requirements and emission factors that are, among other factors, a function of temperature, traffic data were analyzed for the months of January and July (Table 17). Traffic data used for this analysis are presented in tables 18 and 19.

For January, traffic counts indicated a 1999 average daily traffic (ADT) of 5,200 vehicles per day (vpd) and a projected 2022 ADT of 9,200 vpd. ADTs of 5,375 vpd, 6,420 vpd, and 8,852 vpd for 2000, 2006, and 2020, respectively were interpolated. In accordance with the Transportation Research Board's Highway Capacity Manual, Special Report 209 (HCM, Third Edition, updated 1994), and in order to analyze potential air quality impacts in a conservative manner with respect to CO calculations, projected ADTs were adjusted by a factor of 160 percent to account for heavier tourist-season traffic. Using the peak hour to daily traffic ratio of 9.29 percent, design hour volumes of 800 vph, 955 vph, and 1,316 vph were calculated for 2000, 2006, and 2020, respectively. Final adjustments to projected traffic volumes were made in accordance with HCM Chapter 8 in order to arrive at the flow rates (vph) for the peak 15 minutes total for both directions

**Table 17. Traffic Data for 2000**

| Alternative | Month | ADT (vpd) | Design Hours | Flow (vph) | LOS | Avg. Speed (mph) |
|---|---|---|---|---|---|---|
| Existing Conditions | January | 5,375 | 800 | 860 | D | 50 |
| | July | 5,375 | 500 | 549 | C | 52 |

Source: G.E.C., Inc., 2000.

**Table 18. Traffic Data for 2006**

| Alternative | Month | ADT (vpd) | Design Hours | Flow (vph) | LOS | Avg. Speed (mph) |
|---|---|---|---|---|---|---|
| Future w/o Project | January | 6,420 | 955 | 1,030 | D | 50 |
| | July | 6,420 | 596 | 648 | C | 52 |
| Alternative 1 | January | 6,420 | 955 | 1,030 | D | 50 |
| | July | 6,420 | 596 | 648 | C | 52 |
| Alternative 2 | January | 6,420 | 955 | 1,030 | D | 50 |
| | July | 6,420 | 596 | 648 | C | 52 |
| Alternative 3 | January | 6,420 | 955 | 1,030 | D | 50 |
| | July | 6,420 | 596 | 648 | C | 52 |
| Alternative 4 | January | 6,420 | 955 | 1,030 | D | 50 |
| | July | 6,420 | 596 | 648 | C | 52 |
| Alternative 5 | January | 6,420 | 955 | 1,030 | D | 50 |
| | July | 6,420 | 596 | 648 | C | 52 |
| Alternative 6 | January | 6,420 | 955 | 1,030 | D | 50 |
| | July | 6,420 | 596 | 648 | C | 52 |
| Alternative 7 | January | 6,420 | 955 | 1,030 | D | 50 |
| | July | 6,420 | 596 | 648 | C | 52 |
| Alternative 8 | January | 6,420 | 955 | 1,030 | D | 50 |
| | July | 6,420 | 596 | 648 | C | 52 |

Source: G.E.C., Inc., 2000. ADT (vpd), Design Hr./Flow (vph), Speed (average, mph).

**Table 19. Traffic Data for 2020**

| Alternative | Month | ADT (vpd) | Design Hours | Flow (vph) | LOS | Avg. Speed (mph) |
|---|---|---|---|---|---|---|
| Future w/o Project | January | 8,852 | 1,316 | 1,400 | D | 50 |
| | July | 8,852 | 822 | 884 | D | 50 |
| Alternative 1 | January | 8,852 | 1,316 | 1,400 | D | 50 |
| | July | 8,852 | 822 | 884 | D | 50 |
| Alternative 2 | January | 8,852 | 1,316 | 1,400 | D | 50 |
| | July | 8,852 | 822 | 884 | D | 50 |
| Alternative 3 | January | 8,852 | 1,316 | 1,400 | D | 50 |
| | July | 8,852 | 822 | 884 | D | 50 |
| Alternative 4 | January | 8,852 | 1,316 | 1,400 | D | 50 |
| | July | 8,852 | 822 | 884 | D | 50 |
| Alternative 5 | January | 8,852 | 1,316 | 1,400 | D | 50 |
| | July | 8,852 | 822 | 884 | D | 50 |
| Alternative 6 | January | 8,852 | 1,316 | 1,400 | D | 50 |
| | July | 8,852 | 822 | 884 | D | 50 |
| Alternative 7 | January | 8,852 | 1,316 | 1,400 | D | 50 |
| | July | 8,852 | 822 | 884 | D | 50 |
| Alternative 8 | January | 8,852 | 1,316 | 1,400 | D | 50 |
| | July | 8,852 | 822 | 884 | D | 50 |

Source: G.E.C., Inc., 2000. ADT (vpd), Design Hr./Flow (vph), Speed (average, mph).

of flow (service flow) along the project length. Previously described design hour traffic volumes were divided by proscribed peak hour factors (PHF) resulting in service flows for 2000, 2006, and 2020 of 860 vph, 1,030 vph, and 1,400 vph, respectively.

July (non-tourist season) traffic calculations were similar to calculations made for the January values; the only difference was that volumes were not increased by the 160 percent Sunday/holiday factor. As a result, flow rates of 500 vph, 596 vph, and 822 vph were calculated for 2000, 2006, and 2020, respectively.

In addition to temperature, emission factors are influenced by vehicle speed. Accordingly, Level of Service (LOS) evaluations were conducted in order to determine likely average vehicle speeds along the project corridor. Based on current roadway geometry and traffic as well as roadway geometry for the alternatives and projected traffic volumes, LOS-A through LOS-E were calculated per HCM Chapter 8, using directional distribution and lane width factors of one. Heavy vehicle factors were calculated based on data indicating 11.47 percent heavy trucks. For purposes of conservative calculations and to account for tourist season traffic, it was assumed that recreational vehicles and buses each comprised seven percent of overall traffic flows.

With flow rate and average speed estimates for each alternative and analysis year, a preliminary screen of CO concentrations using COSCREEN was conducted for sensitive receptors located in the project area. CO, VOC, and $NO_X$ emission factors were then computed using MOBILE5A. Table 20 presents the results of CO screening analysis with respect to potential concentrations near the Tigertail and Osceola camps. In accordance with FDOT requirements, the analysis is based on January temperatures and rural conditions. Alternatives 3 and 4 were analyzed separately because each involves a substantial offset from the alignments of all other alternatives. As discussed previously, the seven other alternatives (No-Action Alternative, alternatives 1, 2, 5, 6, 7, 8) were analyzed together because of similar alignment, geometry, and traffic flow.

**Table 20. CO Screening Results**

| Alternative and Design Year | Background | | Tigertail Camp | | Osceola Camp | |
|---|---|---|---|---|---|---|
| | 1-hr | 8-hr | 1-hr | 8-hr | 1-hr | 8-hr |
| 2000 Existing Conditions | 1.7 | 1.0 | 6.7 | 4.0 | 8.1 | 4.8 |
| 2006 Alternatives 1, 2, 5, 6, 7, 8 and Future without Project | 1.7 | 1.0 | 6.3 | 4.8 | 8.0 | 4.8 |
| 2006 Alternative 3 | 1.7 | 1.0 | 8.0 | 4.8 | 4.8 | 2.9 |
| 2006 Alternative 4 | 1.7 | 1.0 | 5.9 | 3.5 | 8.1 | 4.8 |
| 2020 Alternatives 1, 2, 5, 6, 7, 8 and Future without Project | 1.7 | 1.0 | 8.1 | 4.8 | 8.4 | 5.0 |
| 2020 Alternative 3 | 1.7 | 1.0 | 8.4 | 5.0 | 8.0 | 4.8 |
| 2020 Alternative 4 | 1.7 | 1.0 | 8.1 | 4.8 | 8.9 | 5.3 |

Source: G.E.C., Inc., 2000. All concentrations are in parts per million (ppm). Maximum concentrations at sensitive receptors include background concentrations.

Table 21 presents the results of MOBILE5A emission factor analysis for CO, VOC, and $NO_X$ emissions. Inputs for cold starts, hot starts, Reid Vapor Pressure, and meteorological data were made in accordance with the PD&E Manual. Default MOBILE5A vehicle mix values were used. Inputs for operating modes, fuel volatility, mileage accrual rates, and other criteria are based on modeling data used for projects in similar areas that has been proven to provide conservative results. CO emission factors are based on January weather and traffic conditions. VOC and $NO_X$ emission factors are based on July weather and traffic conditions.

**Table 21. MOBILE5A Emission Factors**

| Design Year | Emission Factors | | |
|---|---|---|---|
| | CO | VOC | $NO_X$ |
| 2000 | 9.656 | 1.479 | 2.819 |
| 2006 | 7.897 | 1.260 | 2.504 |
| 2020 | 8.024 | 1.150 | 2.251 |

Source: G.E.C., Inc., 2000. All values represent weighted average "All Vehicle," in grams per mile (gpm).

Multiplying the emission factors from Table 19 by the projected flow rate volumes yields total emissions per mile for the various design years. Total flow rate hourly emissions are presented in Table 22.

**Table 22. Total Flow Rate Hourly Emissions**

| Design Year | Total Emission | | |
|---|---|---|---|
| | CO | VOC | $NO_X$ |
| 2000 | 8.30 | 0.81 | 1.55 |
| 2006 | 8.13 | 0.82 | 1.62 |
| 2020 | 11.23 | 1.02 | 2.00 |

Source: G.E.C., Inc., 2000. All values represent weighted average "All Vehicle" emissions in kilograms per mile per hour (Kg/mph).

Regarding the comparison between alternatives versus the future without project alternative, the data indicate that there would be no increase in CO concentrations at the receptors except in design year 2020, and only in those cases where an alternative involves a new alignment that brings the roadway closer to the receptor.

Alternative 3 is projected to increase CO concentrations near the Tigertail Camp from a future without project concentration of 4.8 ppm to 5.0 ppm (a 4 percent increase). Alternative 4 is projected to increase CO concentrations near the Osceola Camp from a future without project concentration of 5.0 ppm to 5.3 ppm (a 6 percent increase). Again, in neither instance is the NAAQS standard of nine ppm exceeded.

MOBILE5A results indicate that total flow rate hourly emissions for CO, VOC, and $NO_X$ would increase 35 percent, 26 percent, and 29 percent, respectively, from 2000 through 2020, regardless of the alternative. The projected increases, as discussed previously, are due solely to projected increases in traffic.

COSCREEN and MOBILE5A results indicate that implementation of the alternatives would have little impact on baseline air quality in the project area for the design years analyzed. Construction associated with the various alternatives has not been included in this analysis, and although it would cause minor short-term air quality impacts in the form of dust from earthwork and other activity, it is expected that such impacts would be

minimized by adherence to all state and local regulations and to FDOT's Standard Specifications for Road and Bridge Construction.

FDEP does not require air emission permits for mobile sources such as construction equipment. Therefore, no air emission permits will be required for the project.

#### 5.7.1.8 Recreation

**No-Action Alternative.** If the project is not implemented, there would be no effects on recreation in the area. Recreational boating, airboating, fishing, and wildlife observation are expected to continue. Currently there is an airboat ramp accessed via S-334. The maintenance road on the north bank of the L-29 Canal provides access to a boat ramp, a picnic area, and approximately 10.5 miles of bank fishing opportunity. Approximately 10.7 miles of the south bank of the L-29 Canal is available for fishing from the north shoulder of Tamiami Trail. There are 19 groups of culverts within the project boundaries. Some of the culvert outfall locations on the south side of the Trail are used by bank fishermen. The unimproved vehicle track atop the L-29 Levee affords views to the north into WCA-3B. ENP is currently involved in the public process of revising their General Management Plan (GMP), which will determine the future status of these businesses. Until the GMP is implemented, the businesses will have access to the area for current uses.

**Action Alternatives.** Under alternatives 2, 4, 6, and 7, there would be no effects on access to boat ramps via S-333 and S-334 other than those associated with normal traffic delays. No effect on bank fishing access to the north bank of the L-29 Canal is anticipated. The use of shoulders for temporary lanes would preclude parking on roadsides. A method of "rolling construction" would be employed, and impacts from construction would be localized. Therefore, bank fishing from the Tamiami Trail would be restricted from those portions of the roadway where construction takes place during the 24-month construction period of alternatives 2 and 7, and the 30-month construction period of Alternative 6. After the completion of construction, bank fishing from the south bank of L-29 Canal could resume fully. Fishing at the culvert outfall locations would be eliminated under alternatives 2b, 6b, and 7b because the reconstruction of the highway does not include the reconstruction of culverts. Approximately six feet of clearance under the bridges of would allow some limited protection from rain or sun to bank fishermen.

Under Alternative 3, access to boat ramps at S-333 and S-334 would be maintained throughout the 30-month construction period. Access to the north bank and to Boat Ramp 153 could be impeded at times during the 30-month construction period because of staging of equipment and materials and ongoing construction activity. The completed roadway may offer better access to Boat Ramp 153 from an improved road but possibly at the expense of parking area. The area currently available for picnicking may be reduced. Approximately seven miles of bank lying between the eastern-most and western-most breaches would reduce bank fishing from the former roadway alignment. Approximately two miles of existing roadbed accessible from the east and 1.5 miles on the west would be free from through traffic and available for fishing. In addition to bank fishing these areas could be used as locations for various gatherings or events. Access to the Airboat Association site and to the three businesses would be unaffected during the construction phase. Bridges built across the L-29 Canal would provide access to

these sites after the completion of construction. The roadway for this alternative would be elevated and would provide panoramic views to the north.

Under Alternative 4, there would be no effect on access to boat ramps via S-333 and S-334 other than normal traffic delays. Nor would there be any loss of access to bank fishing on the north bank of the L-29 Canal. The use of shoulders for temporary lanes would restrict roadside parking; therefore, access for bank fishing from the highway would be restricted at times at construction locations during the 24-month construction period. After construction, bank fishing from the south bank of L-29 Canal could resume. Fishing at the culvert outfall locations would be eliminated because the reconstruction of the road would not include a reconstruction of culverts. Approximately six feet of clearance under the bridges would allow some limited protection from rain or sun to bank fishermen. Additional right-of-way requirements to the south of the existing alignment would encroach on the airboat tour operator's parking areas and buildings. Part of the Airboat Association property would be taken and new access would be required.

Under Alternative 5, access to boat ramps at S-333 and S-334 and fishing or other use of the north bank would not be affected. It is likely that bank fishing would be restricted at locations where construction is taking place along the south bank of the L-29 Canal during the 48-month construction phase. On completion of construction, approximately one mile of existing roadbed would remain accessible on the east and 0.5 mile on the west. Access ramps would be constructed to the Airboat Association of Florida and to the airboat tour businesses. These ramps could also be used to allow the general public access to portions of the existing roadbed that remain after breaches are made in the existing Tamiami Trail roadway. Because there would be no through traffic, some of the area may be suitable for picnicking or other activities. Fishermen using the south bank of the L-29 Canal would be partially sheltered by the elevated roadway. The elevated nature of the roadway would provide panoramic views to both north and south along the entire 10.7-mile length. Alternative 5b would offer essentially the same access opportunities as Alternative 5 except where inhibited by water treatment retention swales. Under Alternative 5c, degradation of the existing roadbed would eliminate bank fishing along virtually the entire existing roadway.

With Alternative 8, there would be no effect on access to boat ramps via S-333 and S-334 other than normal traffic delays. No effect on bank fishing access to the north bank of the L-29 Canal is anticipated. The use of shoulders for temporary lanes would preclude parking on roadsides; therefore, bank fishing from the Tamiami Trail would be restricted from portions of the roadway when construction takes place during the 24-month construction period of Alternative 8a or the 28-month construction period of Alternative 8b. After construction, bank fishing from the south bank of L-29 Canal could resume fully. Fishing at the existing culvert outfall locations would be eliminated under Alternative 8b because the reconstruction of the highway does not include the reconstruction of culverts, but new box culverts would compensate by providing new fishing sites.

#### 5.7.1.9 Cultural Resources

**No-Action Alternative.** Because no construction would be conducted under the without-project condition, there would be no alteration of cultural resources identified in the project area.

**Action Alternatives.** The cultural resource assessment survey resulted in the identification of four newly recorded historic resources:

- Coopertown Airboat Rides and Restaurant (8DA6767)
- Airboat Association of Florida (8DA6768)
- Tamiami Trail (8DA6765)
- Tamiami Canal (8DA6766)

The Tamiami Trail, the Tamiami Canal, and the Coopertown site are considered potentially eligible for listing in the National Registry of Historic Places (NHRP). The Airboat Association site is considered not eligible for NRHP listing (See Section 2.9).

Under all alternatives, portions of the existing Tamiami Trail would be bridged or breached to facilitate flow from WCA-3B to ENP. All alternatives except Alternative 2a would result in extensive reconstruction. However, both the highway and its alignment have received modifications and relocations throughout its history.

Alternatives 2b, 6b, 7b, 8b (with water quality treatment) and 4 would encroach on the Coopertown Airboat Rides and Restaurant. Alternative 3 would not impact any of the cultural resources with the exception of breaching the existing trail. Bridges associated with Alternatives 5, 6, and 7 would involve major reconstruction of the Tamiami Trail, and each would encroach on the L-29 Canal. Table 23 summarizes the impacts of the project on cultural resources.

Initiated in a letter dated September 27, 2001. The State Historical Preservation Officer (SHPO) concurred with the determinations and finds the cultural resource survey complete and sufficient. The coordination letter is attached in Appendix G. Coordination with the Florida Department of State Division of Historical Resources was While all the remaining alternatives would result in a modification of the highway, none would affect the Coopertown site. Several would involve construction along the southern bank of the Tamiami Canal.

It has been determined that the Tamiami Trail Modifications (MWD) Project will have an adverse effect on the Tamiami Trail, and it has the potential to have an adverse effect on the Tamiami Canal, both of which are eligible for nomination to the NHRP. Consultation for the MEMORANDUM OF AGREEMENT to mitigate the adverse effects is currently underway with SHPO and other interested parties. On-going mitigation measures would include the placement of historic markers at various areas of significance along the Tamiami Trail. The markers would include photographs, maps, and narratives.

Should construction activities uncover any unanticipated archaeological finds, activity in the immediate area of the find will be stopped and the Corps notified. Construction will not continue until the site finds are evaluated by a professional archaeologist and the Corps of Engineers provides a notice to proceed.

In the event that human remains are found during either construction or maintenance activities, the provisions of *Chapter 872, Florida Statute (872.05)* will apply. *Chapter 872, Florida Statute* states:

*When human remains are encountered, all activity that might disturb the remains shall cease and may not resume until authorized by the District Medical Examiner (if the remains are less than 75 years old) or the State Archaeologist (if the remains are more than 75 years).*

If human remains less than 75 years are encountered or if they are involved in a criminal investigation, the District Medical Examiner has jurisdiction. If the remains are determined to be more than 75 years in age, then the State Archaeologist takes jurisdiction in determining appropriate treatment and options for the remains. If Native American remains are encountered, provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) may apply.

**Table 23. Summary of Effects of Alternatives on Cultural Resources**

| Alternative | Coopertown Airboat Rides & Restaurant | Airboat Association of Florida[1] | Tamiami Trail | Tamiami Canal |
|---|---|---|---|---|
| 1 | No Impact | No Impact | Bridge Construction | No Impact |
| 2a | No Impact | No Impact | Bridge Construction | Encroachment |
| 2b | Adverse Impacts | Adverse Impacts | Major Reconstruction | Encroachment |
| 3a | No Impact | No Impact | Major Reconstruction | Encroachment |
| 3b | No Impact | No Impact | Major Reconstruction | Encroachment |
| 4a | Adverse Impacts | Adverse Impacts | Major Reconstruction | Encroachment |
| 4b | Adverse Impacts | Adverse Impacts | Major Reconstruction | Encroachment |
| 5a | No Impact | No Impact | Major Reconstruction | Encroachment |
| 5b | No Impact | No Impact | Major Reconstruction | Encroachment |
| 5c | No Impact | No Impact | Major Reconstruction, Embankment Removed | Encroachment |
| 6a | No Impact | No Impact | Major Reconstruction | Encroachment |
| 6b | Adverse Impacts | Adverse Impacts | Major Reconstruction | Encroachment |
| 7a | No Impact | No Impact | Major Reconstruction | Encroachment |
| 7b | Adverse Impacts | Adverse Impacts | Major Reconstruction | Encroachment |
| 8a | No Impact | No Impact | Major Reconstruction | Encroachment |
| 8b | Adverse Impacts | Adverse Impacts | Major Reconstruction | Encroachment |

[1] The Airboat Association of Florida Site is protected by Federal Statute
Source: G.E.C., Inc.

### 5.7.1.10 Aesthetics

**No-Action Alternative.** If the project is not implemented, the existing aesthetic quality of the area would continue.

**Action Alternatives.** The removal of exotic vegetation on the southern side of the Tamiami Trail would be necessary for the modifications and reconstruction associated with Alternative 2, 4, 5, 6, 7, and 8. Alternative 3 would involve the construction of a new road and would remove exotic vegetation along the north side of the L-29 Levee. All alternatives would enhance the aesthetic quality of the area by offering a view of the expanse of the Everglades throughout the length of the project corridor.

### 5.7.1.11 Noise Environment

Peak hour project noise levels for sensitive receptors, which are specific areas within a project area that can be directly affected by project activities, were modeled for the future-without-project (no action) alternative and various other alternatives for design year 2020 (tables 24 through 28). (See Section 2.11 for a description of modeling methodology). In most cases, of those alternatives with multiple variants (with or without water quality), only the variation, likely to result in the greatest impact was modeled. Additionally, some alternatives could be determined to have no impact without modeling. For example, because alternatives 2a and 4 (4a and 4b) are equivalent other than proximity to the Tigertail Camp, only that alignment nearest the camp, Alternative 2a, once it was determined as having no impact, required modeling. Specific areas for which modeling was conducted include:

- **Flight 592 Memorial.** Treatment of such special use areas (cemeteries, memorials) is not clearly defined in federal noise regulations. Assuming the Memorial can be considered a Category B activity, TNM modeling indicates no noise impacts resulting from any of the alternatives. Accordingly, noise abatement measures should not require consideration.

- **Osceola Camp.** Modeling indicates alternatives 1, 2a, 6a, 7a, and 8a, although predicted to exceed FDOT approach criteria, appear to have no impact when compared to future without project conditions. Alternatives 2b, 4, 6b, and 7b, and 8b are predicted to exceed FDOT approach criteria and cause impacts beyond the future without project alternative. As a result, noise abatement measures would require consideration. Alternatives 3 and 5 would have no impact.

- **Tigertail Camp.** Modeling indicates Alternative 3 would exceed the FDOT approach criteria, and noise abatement measures would require consideration. None of the other alternatives would affect the Tigertail Camp.

- **Airboat Association of Florida, Safari Park, Gator Park, and Coopertown Airboats.** Modeling indicates alternatives 1, 2, 4, 7, and 8 although predicted to exceed FDOT approach criteria, appear to have no impact when compared to future with project conditions. The remaining alternatives would have no impact.

In accordance with the FDOT Environmental Management Office Project Development and Environment Manual I (PD&E Manual), an analysis and preliminary design of noise abatement barriers was performed for residential properties where estimated noise levels (1) met or exceeded FDOT NAC as a result of an alternative, and (2) are estimated to be noticeably higher (greater than or equal to 3dBA) than future without project noise levels. Noise abatement barriers were not considered in the case of commercial properties along the project. Per FDOT criteria, a unit barrier construction cost of $25.00 per square foot and a design insertion loss of 10 dBA were utilized.

**Table 24. Predicted Noise Levels – Flight 592 Memorial**

| Receiver | Existing | No Action | Alt. 1 | Alt. 2 | Alt. 3 | Alt. 5 | Alt. 6 | Alt. 7 | Alt. 8 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 59.9 | 62.0 | 62.0 | 62.2 | 63.9 | 63.4 | 62.0 | 62.0 | 62.0 |

Source: G.E.C., Inc., 2000. All values LAeq1h (dBA) for 2020 except existing (E, 2000).

**Table 25. Predicted Noise Levels – Osceola Camp**

| Receiver | Existing | No Action | Alt. 1 | Alt. 2a | Alt. 2b | Alt. 3 | Alt. 4 | Alt. 5 | Alt. 6b | Alt. 7b | Alt. 8b |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **68.3** | **70.5** | **70.5** | **70.4** | **71.3** | 62.5 | **73.4** | 65.7 | **71.3** | **71.3** | **71.3** |
| 2 | 62.0 | 64.2 | 64.2 | 64.2 | 65.1 | 58.6 | **66.0** | 62.3 | 65.1 | 65.1 | 65.1 |
| 3 | 57.5 | 59.6 | 59.6 | 61.8 | 62.4 | 57.3 | 63.2 | 60.5 | 62.4 | 62.4 | 62.4 |
| 4 | 62.2 | 64.3 | 64.3 | 65.3 | **66.1** | 60.3 | **67.0** | 63.9 | **66.1** | **66.1** | **66.1** |
| 5 | 62.6 | 64.7 | 64.7 | 64.7 | **66.0** | 57.6 | **67.7** | 61.7 | **66.0** | **66.0** | **66.0** |

Source: G.E.C., Inc., 2000. All values LAeq1h (dBA) for 2020 except existing (E, 2000).
Levels meeting FDOT NAC in **bold**.

**Table 26. Predicted Noise Levels – Airboat Association of Florida, Safari Park and Coopertown Airboats**

| Receiver | Existing | No Action | Alt. 1 | Alt. 2a | Alt. 2b | Alt. 4 | Alt. 5 | Alt. 6 | Alt. 7a | Alt. 7b | Alt. 8a | Alt. 8b |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 69.6 | **71.7** | **71.7** | **71.6** | **72.6** | **75.3** | 67.1 | 67.1 | **71.7** | **72.6** | **71.7** | **72.6** |
| 2 | 69.9 | **72.0** | **72.0** | **72.0** | **73.0** | **74.4** | 67.4 | 67.4 | **72.0** | **73.0** | **72.0** | **73.0** |
| 3 | 62.7 | 64.8 | 64.8 | 67.1 | 67.6 | 68.5 | 64.2 | 64.2 | 64.8 | 67.6 | 64.8 | 67.6 |

Source: G.E.C., Inc., 2000. All values LAeq1h (dBA) for 2020 except existing (E, 2000).
Levels meeting FDOT NAC in **bold**.

**Table 27. Predicted Noise Levels – Gator Park**

| Receiver | Existing | No Action | Alt. 1 | Alt. 2a | Alt. 2b | Alt. 4 | Alt. 5 | Alt. 6 | Alt. 7a | Alt. 7b | Alt. 8a | Alt. 8b |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 69.6 | **71.7** | **71.7** | **71.7** | **73.0** | **74.9** | 67.1 | 67.1 | **71.7** | **73.0** | **71.7** | **73.0** |
| 2 | 62.7 | 64.9 | 64.9 | 64.9 | 66.2 | 67.3 | 63.7 | 63.7 | 64.9 | 66.2 | 64.9 | 66.2 |

Source: G.E.C., Inc. 2000. All values LAeq1h (dBA) for 2020 except existing (E, 2000).
Levels meeting FDOT NAC in **bold**.

**Table 28. Predicted Noise Levels – Tigertail Camp**

| Receiver | Existing | No Action | Alt. 1 | Alt. 2 | Alt. 3a | Alt. 3b | Alt. 5 | Alt. 6 | Alt. 7 | Alt. 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 60.5 | 62.6 | 62.6 | 63.2 | 64.9 | **66.7** | 62.1 | 62.1 | 62.6 | 62.6 |
| 2 | 60.8 | 62.9 | 62.9 | 63.4 | **66.0** | **68.6** | 62.3 | 62.3 | 62.9 | 62.9 |

Source: G.E.C., Inc., 2000. All values LAeq1h (dBA) for 2020 except existing (E, 2000). Levels meeting FDOT NAC in **bold**.

Barriers were analyzed at the Osceola Camp for alternatives 2b, 6b, 7b, 8b, and 4 assuming a roadside barrier alignment. For Alternative 2b, 6b, 7b, and 8b, preliminary modeling indicates that a wall ranging in height from eight to 20 feet over a length of approximately 1,450 feet would be required. Total cost for such a structure is estimated at $425,000, or, assuming 14 residential structures benefited, $30,360 per residence.

Preliminary modeling for Alternative 4 (4a and 4b) indicates that a wall ranging in height from eight to 16 feet over a length of approximately 1,250 feet would be required. Total cost for the structure is estimated at $455,000 or approximately $32,500 per residence.

Barriers at the Tigertail Camp for alternatives 3a and 3b were also evaluated assuming a roadside barrier alignment. For Alternative 3a, modeling indicates the required wall would range in height from eight to 18 feet over a length of approximately 1,130 feet and would cost $465,100, or, assuming six residential structures benefited, $77,520 per residence.

Modeling for Alternative 3b indicates that a wall ranging in height from eight to 18 feet over a length of approximately 934 feet would be required. Total cost for the structure is estimated at $405,100, or $67,520 per benefited residence.

The FDOT unit cost threshold, $30,000 per benefited residence, is exceeded by all alternatives for which a barrier is indicated. Under FDOT criteria, when the cost per benefited residence exceeds $30,000, costs would be deemed not reasonable, and a noise barrier would not normally be constructed.

Construction and vibration noise generated because of the project would cause temporary impacts through increases in noise levels near the sensitive receptors. Noise emissions from construction equipment range generally from 70 dBA for pumps and portable equipment to approximately 95 dBA for tractors, graders, and other heavy equipment.

Avoidance and/or mitigation options will be developed during the project development and design phases and specified in construction plans for implementation by the contractor. In accordance with FDOT's *Standard Specifications for Road and Bridge Construction*, such avoidance and mitigation measures might include, but are not limited to:

1. Maintaining and operating construction equipment in a manner that minimizes noise;

2. Equipping engines with properly functioning mufflers;

3. Limiting noise emissions near sensitive receptors to the greatest extent possible;

4. Installing portable acoustic barriers around stationary construction equipment;

5. Locating stationary equipment as far from sensitive receptors as possible; and,

6. When possible, scheduling noisy operations for the middle of the day.

#### 5.7.1.12 Transportation

**No-Action Alternative.** When the MWD project is completed, water elevation in the L-29 Canal will increase by approximately two feet. The roadway base would be subjected to increased saturation and would likely require more frequent maintenance. Any occurrence of overtopping could close the road or reduce traffic to one lane, thereby impacting motorists who use the roadway. Overtopping would require the deployment of traffic control devices to warn motorists and slow traffic. The implications could be severe if overtopping interferes with the passage of emergency vehicles or with hurricane evacuation.

**Action Alternatives**. Implementation of action alternatives would neither increase nor decrease traffic on the Tamiami Trail under any alternative. Reconstruction of the roadway would eliminate undulations and cracks in the highway surface, and improve the drivability of the road.

During the construction phase of the project, it may be necessary under some conditions to temporarily close one lane of the highway. Under these situations, signs, signals, and other appropriate traffic controls would be utilized to ensure safety.

The existing boat access across the L-29 Canal to the Tigertail Camp would be replaced with a bridge across the canal under Alternative 5. Boat access to the Tigertail Camp would remain available under all other alternatives, and access to the camp by the unimproved road along the L-29 Levee would remain. Under Alternative 3, the existing Tamiami Trail would be abandoned, and boat access would become unnecessary; Alternative 3 provides access to the Tigertail Camp by means of a side road near the camp.

Highway construction in the area of the boat access area may temporarily eliminate its use. The use of shoulders for temporary lanes would restrict roadside parking; therefore, there may be no parking area for vehicles to allow individuals to access the Tigertail Camp by boat.

#### 5.7.1.13 Tribal Lands

Under Alternatives 2b, 4a, 4b, 6b, 7b, and 8b, the parking lot at the Osceola Camp would be incorporated into the highway right-of-way. Under Alternative 4b a mobile home, a fixed residence, and an associated out-building would be incorporated into the

right-of-way. No direct effects to the Tigertail Camp would result. Under all alternatives, access would be provided to both the Tigertail Camp and the Osceola Camp.

### 5.7.1.14 Economics/Socioeconomics

The U.S. Department of Commerce has developed a model based on the interaction of various segments within a local economy. Local data is input to calibrate the effects of dollar expenditures in one segment on other segments. The effects on all the other segments are totaled to obtain an estimate of the total impact to the local economy. The current iteration used by the Miami-Dade Planning and Zoning Department is the RIMS-2 version based on 1995 local data for the Miami-Dade region. This model gives a Construction Multiplier of 1.8792 and an earnings multiplier of 0.5136. For each dollar spent in construction, $1.8792 dollars of new business are generated throughout the local economy. Likewise, $0.5136 dollars of earnings (wages) are generated. For each million dollars spent, the new business volume generated would equal $1,879,200 and the resultant earnings would be approximately $513,600.

Each million dollars spent in construction would generate employment demand equivalent to 22 full-time man-years. Table 29 summarizes the effects of construction expenditures for each alternative on the local economy.

**Table 29. RIMS-2 Model Applied to Construction Costs**

| Alternatives | Construction Costs | New Business Volume | Earnings | Man Years Of Employment |
|---|---|---|---|---|
| 1 | $14,330,871 | $26,930,573 | $7,360,335 | 315 |
| 2a | $24,354,651 | $45,828,122 | $12,525,182 | 537 |
| 2b | $58,550,658 | $110,028,397 | $30,071,616 | 1,288 |
| 3a | $67,959,310 | $127,709,139 | $34,903,900 | 1,495 |
| 3b | $73,457,368 | $138,041,086 | $37,727,701 | 1,616 |
| 4a | $45,235,110 | $85,005,819 | $23,232,751 | 995 |
| 4b | $47,128,438 | $88,563,761 | $24,205,164 | 1,037 |
| 5a | $135,915,000 | $255,411,468 | $69,805,939 | 2,990 |
| 5b | $140,314,000 | $263,678,069 | $72,065,265 | 3,087 |
| 5c | $142,156,700 | $267,140,871 | $73,011,681 | 3,127 |
| 6a | $72,877,979 | $136,952,298 | $37,430,127 | 1,603 |
| 6b | $81,369,677 | $152,909,897 | $41,791,463 | 1,790 |
| 7a | $23,045,733 | $43,307,541 | $11,836,288 | 507 |
| 7b | $51,858,385 | $97,452,277 | $26,634,465 | 1,141 |
| 8a | $45,499,995 | $85,503,591 | $23,368,796 | 1,001 |
| 8b | $47,081,029 | $88,474,670 | $24,180,815 | 1,036 |

Source: PBS&J, 2001 (Engineering Appendix).

**Businesses.** There are currently three businesses on the south side of the Tamiami Trail in the project corridor: Coopertown Airboat Tours and Restaurant, Gator Park, Inc. and Safari Airboat Rental. All provide airboat tours, and all have restaurants and gift shops on their premises. Access to these businesses would be provided under all alternative actions. However, during construction of the highway, while provisions are

made to maintain the flow of traffic, there may be infrequent motoring delays due to slower speeds or occasional stops. Because some drivers may wish to avoid construction areas, the number of visitors to businesses during the period of construction may be reduced.

Several of the alternatives would require additional right-of-way to the south of the existing roadway. Those alternatives would involve the acquisition of property from businesses. Table 30 summarizes the additional footage needed for the increased right-of-way for each alternative and any facilities or structures that would be lost by the business owner. Alternative 4b extends the right-of-way boundary farther south than any other alternative, and it would have the greatest impact on businesses. The projected footprint for Alternative 4b would take virtually all of the parking areas of the three businesses, many of their facilities, and some of the buildings. It is unlikely the businesses could continue under this circumstance. The ecotourism opportunities provided by these operators would no longer be available.

**Airboat Association of Florida.** The Airboat Association of Florida is a non-profit conservation and outdoor recreation organization. The Airboat Association site is located approximately 3.5 miles from the western end of the project corridor. All alternatives include provisions for maintaining access to the site. During construction, the flow of traffic on the Tamiami Trail would be maintained; however, motorists accessing the site may experience temporary delays because of traffic control measures.

Several of the alternatives would require the acquisition of additional right-of-way on the southern side of the highway. The most extensive is Alternative 4b, which relocates the right-of-way boundary 74 feet farther south than currently exists. It would involve the conversion of the Airboat Association parking lot into the highway right-of-way.

**Osceola Camp.** Under all alternatives, access to the Osceola Camp would be provided during construction and following completion of the project. However, the various alternatives present an array of effects of the project.

Those alternatives that would relocate the highway closer to the Osceola Camp are those that would create adverse effects, including increased noise, decreased privacy, increased proximity to exhaust emissions, and increased exposure of children at play to vehicles traveling at highway speeds. Under Alternative 2b, 4a, 4b, 6b, 7b, and 8b, the parking lot used by the Osceola Camp would be lost. Expansion of the highway right-of-way associated with Alternative 4b would encompass a model home, a fixed residence, and an associated out building.

Highway noise would be reduced under Alternative 3, which relocates the highway across the L-29 Canal, farther from the Osceola Camp. It would result in considerably more privacy for the Osceola Camp, since access would be only from the western end of the study area.

Under alternatives 2, 4, 5, 6, 7, and 8 short-term traffic disruptions and noise would be created due to construction. Alternative 3 appears to be a sufficient distance away to avoid notable short-term effects.

**Table 30. Direct Effects of Alternatives on Businesses**

| Alternatives | Additional Footage Required For Right-Of Way | Facilities/Structures Affected | |
|---|---|---|---|
| 1 | 0 | None | |
| 2a | 0 | None | |
| 2b | 51feet | Coopertown | Boat Dock<br>Parking Area<br>Gift Shop/Restaurant<br>Office/Tour Staging Facility |
| | | Gator Park | Boat Dock<br>Parking Area |
| | | Everglades Safari | Parking Area |
| 3a | N/A | None | |
| 3b | N/A | None | |
| 4a | 50 feet | Coopertown | Boat Dock<br>Parking Area<br>Gift Shop/Restaurant<br>Office/Tour Staging Facility |
| | | Gator Park | Boat Dock<br>Parking Area |
| | | Everglades Safari | Parking Area |
| 4b | 74 feet | Coopertown | Major Portion of Business Area<br>Residence |
| | | Gator Park | Boat Dock/Basin<br>Parking Area<br>Gift Shop/Restaurant |
| | | Everglades Safari | Boat Dock/Tour Staging Area<br>Parking Area<br>Several Structures |
| 5a | N/A | None | |
| 5b | N/A | None | |
| 5c | N/A | None | |
| 6a | 0 | None | |
| 6b | 51 feet | Coopertown | Boat Dock<br>Parking Area<br>Gift Shop/Restaurant<br>Office/Tour Staging Facility |
| | | Gator Park | Boat Dock<br>Parking Area |
| | | Everglades Safari | Parking Area |
| 7a | 0 | None | |
| 7b | 51 feet | Coopertown | Boat Dock<br>Parking Area<br>Gift Shop/Restaurant<br>Office/Tour Staging Facility |
| | | Gator Park | Boat Dock<br>Parking Area |
| | | Everglades Safari | Parking Area |

| Alternatives | Additional Footage Required For Right-Of Way | Facilities/Structures Affected | |
|---|---|---|---|
| 8a | 0 | None | |
| 8b | 51 feet | Coopertown | Boat Dock<br>Parking Area<br>Gift Shop/Restaurant<br>Office/Tour Staging Facility |
| | | Gator Park | Boat Dock<br>Parking Area |
| | | Everglades Safari | Parking Area |

Source: G.E.C., Inc., 2001

**Tigertail Camp.** All alternatives would include provisions for access to the Tigertail Camp. However, Alternative 5, under which a 10.7-mile bridge would be constructed, would replace boat access to the Tigertail Camp with a bridge. Under Alternative 3, the shift in the highway to the north of the L-29 Canal would eliminate the need for boat access.

Alternative 3 would result in the camp being subjected to increased noise effects from highway traffic as well as exhaust fumes that are more concentrated than at present. Closer proximity of the highway could impair the visual aesthetics the residents enjoy and decrease the existing physical privacy. There is also a concern for physical safety. The relocated highway could create greater safety risks by increasing the exposure of children at play to vehicles traveling at highway speeds. The other alternatives, all of which are located across the L-29 Canal, would have no impact on the Tigertail Camp.

It is likely that under Alternative 3 there would be some short-term traffic disruptions and noise due to construction. The remaining alternatives appear to be a sufficient distance away so as not to have notable short-term effects.

### 5.7.1.15 Flight 592 Memorial

No impacts on the Flight 592 Memorial are expected. Access to the site will be provided under all action alternatives.

### 5.7.1.16 Real Estate

**No-Action Alternative.** Under the No-Action Alternative, no impacts to real estate would occur.

**Action Alternatives.** The lands and easements needed to implement the Tamiami Trail modifications are currently under several ownerships. A complete copy of all real estate requirements and issues is included in Appendix H.

The footprints of alternatives 1, 2a, 2b, 5, 6a, 6b, 7a, 7b, 8a, and 8b fall within the maintenance right-of-way for the existing roadway and ownership is claimed by FDOT. This ownership claim is partially overlapped by SFWMD's right-of-way claim along the L-29 Canal. This apparently is common when a roadway parallels a canal, and in the

past has been resolved through the exchange of quick claims between agencies to establish a contiguous right-of-way boundary shared by the two agencies. In some areas, SFWMD holds only flowage easements and fee title is held by approximately two dozen private landowners. Most of the private holdings involve large tracts, but a few are as small as two acres.

The footprint of Alternative 3 falls within the right-of-way claimed by the SFWMD. However, in some areas, SFWMD holds only flowage easements, and fee title is held by approximately two dozen private landowners. Most of the private holdings involve large tracts, but a few are as small as two acres.

The footprint of Alternative 4 extends to the south of the existing roadway and encompasses part of the Osceola Camp of the Miccosukee Tribe and the Airboat Association property. The Osceola Camp lies on property owned by the National Park Service. The rest of the land in the footprint for this alternative is either currently owned by or being purchased by the National Park Service.

No relocations (as described in Public Law 91-646) would be required by alternatives 1, 2a, 2b, 5, 6a, 6b, 7a, 7b, 8a, and 8b, as their footprints are generally within the existing right-of-way claims of FDOT. The footprint of Alternative 3 would require obtaining fee title ownership from approximately 24 private owners, but would not affect any residential or business improvements. The footprint of Alternative 4 would affect some facilities at the Airboat Association, which would require relocation payments as specified under the provision of Title II if Public Law 91-646, The Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended. The footprints for all of the alternatives would require obtaining fee title ownership from private owners, but would not affect any residential or business improvements. No relocation payments, as specified under the provision of Title II of Public Law 91-646, The Uniform Relocation Assistance and Real Property Acquisition Act of 1970, will be required.

Alternatives 2a and 2b would require the acquisition of 18.442 and 63 acres of land, respectively, to the immediate south of the existing right-of-way. The average appraised value per acre for land south of the Tamiami Trail is $646.00. The required additional acreage would be along the entire project length to alternatives 2a and 2b, and have an estimated cost of $11,913 and $41,064, respectively.

Alternatives 3a and 3b would require the acquisition of 95 and 157 acres of land, respectively. The average appraised value for land north of the Tamiami Trail is $206.00. The required additional acreage for alternatives 3a and 3b would have an estimated cost of $19,570.00 and $32,342.00, respectively.

Alternatives 4a and 4b would require the acquisition of 74 and 112 acres of land, respectively. The average appraised value per acre for land south of the Tamiami Trail is $646.00. The required additional acreage for alternatives 4a and 4b would have an estimated cost of $47,804.00 and $72,352.00, respectively.

Alternative 5, although mostly within the existing right-of-way would require the acquisition of 10.115 acres of additional land. This land is north of the Tamiami Trail in the L-29 Canal. The average appraised value per acre for land south of the Tamiami Trail is $646.00. The required additional acreage would have an estimated cost of $6,534.

Alternative 6a would require the acquisition of 10.635 acres of land to the immediate north of the existing right-of-way, and 17.685 acres to the immediate south. Alternative 6b would require the acquisition of 32.504 acres of land to the immediate south of the existing right-of-way. The average appraised value per acre for land north of the Tamiami Trail is $206.00, and $646.00 per acre for land to the south. The required additional acreage for both alternatives would be along the entire project length, and have an estimated cost of $13,262.00 for alternative 6a and $20,998.00 for alternative 6b.

Alternative 7a would require the acquisition of 13.327 acres of land to the immediate north of the existing right-of-way, and 21.759 acres to the immediate south. Alternative 7b would require the acquisition of 41.270 acres of land to the immediate south of the existing right-of-way. The average appraised value per acre for land north of the Tamiami Trail is $206.00, and $646.00 per acre for land to the south. The required additional acreage for both alternatives would be along the entire project length, and have an estimated cost of $16,366.00 for alternative 7a and $26,660.00 for alternative 7b.

Alternative 8a would require the acquisition of 13.857 acres of land to the immediate north of the existing right-of-way, and 23.038 acres to the immediate south. Alternative 8b would require the acquisition of 43.720 acres of land to the immediate south of the existing right-of-way. The average appraised value per acre for land north of the Tamiami Trail is $206.00, and $646.00 per acre for land to the south. The required additional acreage for both alternatives would be along the entire project length, and have an estimated cost of $17,277.00 for alternative 8a and $28,243.00 for alternative 8b.

Utilities within the existing corridor may be affected by construction. There is a buried telephone facility behind the guardrail on the south side of the road and a 23 kilovolt overhead electric line running along the south side, approximately 100 feet south of the existing guardrail. Just north of the guardrail on the north side is an additional buried telephone facility. There are utilities along the L-29 Levee: a buried telephone cable at the base of the levee on the south side and power poles on the canal maintenance berm.

There are no additional non-project-related relocations of public highways or bridges affected by the alternatives under consideration.

### 5.7.1.17 Environmental Justice and Impacts on Children

An environmental justice analysis, which is intended to "analyze and address the distributional effects of environmental impacts on certain populations," is included to address the requirements of Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.* The purpose of the EO is to prevent the impacts of an action from falling disproportionately on minority or low-income communities. A determination that disproportionate impacts are evident can be subjective and a matter of legal interpretation. Disproportionate impacts occur when, in order to minimize or avoid impacts to another community or environmental resource, the impacts are instead focused on the minority or low-income community.

**Tigertail Camp**. Under all alternative actions, some short-term traffic disruptions and construction noise would likely be created. However, because of the distance to the Tigertail Camp from the placement of roadway associated with alternatives 1, 2, 4, 5, 6, 7, and 8, which remain across the L-29 Canal from the Tigertail Camp, no long-term adverse impacts to the affected community are expected. Likewise, no disproportionate impacts are expected.

Alternative 3, however, relocates the highway to the north of the L-29 Levee, placing the roadway in the proximity of the community. Under existing conditions, the Tamiami Trail is approximately 120 feet from the Tigertail Camp; under Alternative 3, the highway would be approximately 54 feet from the camp. This decreased distance coupled with the elevated nature of the roadway would increase traffic noise levels for the residents, and would likely create adverse long-term adverse social (lack of privacy) impacts. Due to the close proximity to the Tigertail Camp, the concept of "disproportionate shares of negative environmental consequences" may apply because impacts to wetlands and other natural resources are minimized while impacts to the Tigertail Camp are increased.

**Osceola Camp**. Under alternatives 1, 2, 4, 5, 6, 7, and 8 short-term traffic disruptions and noise would be created due to construction. Alternative 3 appears to be a sufficient distance away so as not to have significant short-term effects.

Alternatives 2b, 6b, 7b, and 8b, which include treatment of highway runoff, would place the road closer to the community than at present; Alternative 4 would incorporate portions of the Osceola Camp into the highway right-of-way. The increased noise and closer proximity of traffic and the taking of property may create the condition of "disproportionate shares of negative environmental consequences" because of increased adverse impacts to the community brought about by efforts to minimize impacts to natural resources.

**Impacts on Children**. An investigation of environmental health risks and children is included to comply with the intent of EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. Data used to characterize the population within the affected area were obtained from local resources through interviews.

Because alternatives 1, 2a, 6a, 7a, 8a, and 5 do not significantly change the location of the highway, none is expected to increase either the environmental health or safety risks to children in either the Tigertail or the Osceola camps over existing conditions. Because Alternative 3 involves relocating the highway to the north of the L-29 Canal and places it in proximity to the Tigertail Camp, it may create greater safety risks by increasing the exposure of children at play to vehicles traveling at highway speeds and increasing noise. Noise Modeling indicates that Alternative 3 would exceed the FDOT approach criteria at the Tigertail Camp (see Section 5.7.11). Likewise, alternatives 2b, 6b, 7b, 8b, and 4, which relocate the roadway closer to the Osceola Camp, exceed FDOT approach criteria. Modeling indicates alternatives 1, 2a, 6a, 7a, and 8a, although predicted to exceed FDOT approach criteria, appear to have no impact on the Osceola Camp when compared to future without project conditions. A relocation of the highway to the south, closer to the Osceola Camp residents, may result in increased risks to children in that community.

## 5.7.2 SUMMARY OF ENVIRONMENTAL IMPACTS OF EACH ALTERNATIVE

### 5.7.2.1 No-Action

Under the no-action alternative, there would be no effects on geology, soils, surface or ground water quality, hazardous, toxic, or radiological waste, biological communities, threatened or endangered species, climate, air quality, recreation, cultural resources, aesthetics, and tribal lands. However, there is a potential area of conflict with respect to water management and transportation operations. Overtopping of the highway during high water events could potentially affect public safety and the needs of ENP. During periods of high water, it may be necessary to restrict water levels in the L-29 Canal to prevent flooding of the highway. In the event that flooding occurs, traffic flow would likely be reduced to a single lane or the road could be closed. The implications could be severe if overtopping were to impede emergency vehicles or if it interferes with hurricane evacuation. Increased water levels in the L-29 Canal would increase the inundation of the road base, thereby accelerating the rate of deterioration of the highway.

ENP personnel have expressed concern that to alleviate the adverse effects of highway overtopping, it may become necessary to restrict water levels in the L-29 Canal through a reduction in flow rates. Such an action would be counter to plans to provide hydrologic restoration to ENP.

Noise levels along the Tamiami Trail are likely to increase over time due to projected increased levels of traffic.

Water quality in ENP is also a potential area of concern. If inflow from the Everglades Agricultural Area is kept at the present level or greater, increases in nitrogen and phosphorus concentrations at the northern points of inflow to ENP would likely increase. In addition, depending on the volume and the rate of flow from the pumping stations, sediments and bottom material potentially contaminated with metals and pesticides would migrate slowly southward through the WCA canals.

Contaminants contributed by highway runoff are currently at low concentrations. The concentrations of runoff substances would slowly increase as traffic volume increases.

Another area of concern is compartmentalization. Biological communities have been affected by the construction of levees, canals, and roads. These have created barriers to the free movement of organisms, particularly those with limited mobility, such as aquatic organisms (fishes, invertebrates, etc.) One of the goals is to reduce this partitioning and promote ecological connectivity. Under the No-Action Alternative, this MWD project would not provide compatibility with the CERP goal of improving ecological connectivity.

Finally, wildlife mortality is an area of concern. It has been reported that vehicle collisions along the Tamiami Trail are a major cause of wildlife mortality in the Everglades. The FHWA has provided policy and guidance on addressing this issue. Certain criteria have been established to determine the need for a wildlife crossing. Under the No-Action Alternative, there would be no opportunity for the implementation of measures to reduce wildlife mortality within the project area.

### 5.7.2.2 Alternative 1. Existing Alignment and Profile with Four New Bridges

The four bridges associated with this alternative would provide sufficient hydraulic opening to convey projected MWD Flows under the Tamiami Trail. The existing culvert system, which extends along the length of the Tamiami Trail in the project area, enables a general equalization of flows to ENP that approximates sheet flow.

The four bridges associated with Alternative 1 would provide connectivity between the L-29 Canal and ENP. Installation of the bridges would provide a combined hydraulic opening that would, in turn, provide partial connectivity between ENP and the L-29 Canal. Improving ecological connectivity would enhance aquatic biological communities south of the existing Tamiami Trail. Wetland impacts associated with Alternative 1 include a loss of 2.92 functional units (FU) (see Section 5.7.5.5 for an explanation of the WRAP model for determining wetland impacts).

Effects on threatened and endangered species were evaluated. Primary and secondary zones were established for the Tamiami West wood stork colony, the Tamiami East wood stork colony, and the Frog City wading bird colony. The USFWS has developed restrictions primarily on highway construction and human activity in these zones for periods ranging from 18 to 48 months. Under Alternative 1, 2,295 linear feet of US 41 is located in the primary zone and 2,122 linear feet in the secondary zone for the Tamiami West Colony. The only restricted area for the Tamiami East Colony is 3,123 linear feet in the secondary zone. Furthermore, the small colony of wading birds located in Frog City is situated in WCA-3B close to the L-29 Levee, approximately one-quarter mile west of the Tigertail Camp. This small willow head supports nesting by tricolored herons and great egrets. A buffer zone of 125 meters (410 feet) was established to prevent human disturbances during nesting season and periods where wading birds are roosting at the colony site. Under Alternative 1, 449 linear feet would be under development restriction for wading birds. Although these restrictions would require phasing of construction, no significant impacts to threatened or endangered species are expected.

The cultural resource assessment survey resulted in the identification of four newly recorded historic sites: Coopertown Airboat Rides and Restaurant, Airboat Association of Florida, Tamiami Trail, and L-29 Canal. Alternative 1 would result in some modification of the highway, but would not impact any of the other resources.

Alternative 1 would result in relatively minor impacts on the Osceola Camp, the Airboat Association of Florida, and the three airboat tour businesses. Short-term traffic disruptions and noise, which are expected during construction, could possibly affect the Osceola Camp community.

Noise levels throughout the Tamiami Trail are an area of concern. Around the Osceola Camp area, modeling indicates that Alternative 1, although predicted to exceed FDOT approach criteria, would have no impact when compared to future without project conditions (see Section 2.11 for modeling methodology).

Air quality modeling (Section 5.7.7) indicates that Alternative 1 would have no significant effect on air quality.

This alternative would neither increase nor decrease traffic on the Tamiami Trail. During the construction phase of the project, it may be necessary under some conditions to

temporarily close one lane of the highway. Under these situations, signage, signals, and other appropriate traffic controls would be utilized to ensure safety.

The RIMS-2 economic model (Section 5.7.14) indicates that expenditures associated with the construction of Alternative 1 would produce $26,930,573 in new business generated and generate $7,360,335 in wages in the local economy, which would represent approximately 315 man years of employment.

Alternative 1 may result in temporary impacts to fishing from the Tamiami Trail right-of-way at or near construction sites. Access to boat ramps would not be affected.

#### 5.7.2.3 Alternative 2. Existing Roadway Alignment with Raised Profile and Four New Bridges

The four bridges associated with this alternative would provide sufficient hydraulic opening to convey projected MWD Flows under the Tamiami Trail. The existing culvert system, which extends along the length of the Tamiami Trail in the project area, currently enables a general equalization of flows to ENP that approximates sheet flow. Although the bridges and breaches would be capable of conveying the required amount of water, the retention of the culvert system under Alternative 2a would assist in maintaining sheet flow.

The four bridges associated with Alternative 2 would provide connectivity between the L-29 Canal and ENP. Installation of the bridges would provide a combined hydraulic opening that would, in turn, provide partial connectivity between ENP and the L-29 Canal. Improving ecological connectivity would enhance aquatic biological communities south of the existing Tamiami Trail. Wetland impacts associated with Alternative 2a include a loss of 10.10 FUs; 37.48 FUs would be lost under Alternative 2b (see Section 5.7.5.5 for an explanation of the WRAP model for determining wetland impacts).

Effects on threatened and endangered species were evaluated. Primary and secondary zones were established for the Tamiami West wood stork colony, the Tamiami East wood stork colony, and the Frog City wading bird colony. The USFWS has developed restrictions primarily on highway construction and human activity in these zones for periods ranging from 18 to 48 months. Currently, under Alternative 2, 2,295 linear feet of US 41 are located in the primary zone and 2,122 linear feet in the secondary zone for the Tamiami West Colony. The only restricted area for the Tamiami East Colony is 3,123 linear feet in the secondary zone. Furthermore, the small colony of wading birds located in Frog City is situated in WCA-3B close to the L-29 Levee, approximately one-quarter mile west of the Tigertail Camp. This small willow head supports nesting by tricolored herons and great egrets. A buffer zone of 125 meters (410 feet) was established to prevent human disturbances during nesting season and periods where wading birds are roosting at the colony site. Under Alternative 2, 449 linear feet would be under development restriction for wading birds. Although these restrictions would require phasing of construction, no significant impacts to threatened or endangered species are expected.

The cultural resource assessment survey resulted in the identification of four newly recorded historic sites: Coopertown Airboat Rides and Restaurant, Airboat Association of Florida, Tamiami Trail, and L-29 Canal. Alternative 2a would involve modification of the Tamiami Trail, but would not impact any of the other resources. Alternative 2b would

involve major reconstruction of the Tamiami Trail and would severely impact Cooper-town Airboat Rides and Restaurant: two structures and the boat dock would be lost.

Aesthetics would be enhanced by the removal of exotic vegetation on the southern side of the Tamiami Trail, which is necessary for the modifications and reconstruction under this action alternative.

Alternative 2a would result in relatively minor impacts on the Osceola Camp, the Airboat Association of Florida, and the three airboat tour businesses. Alternative 2b would create significant adverse impacts. The footprints under Alternative 2a fall within the maintenance right-of-way for the existing roadway and ownership claimed by FDOT; therefore, no relocations would be required. Relocations may be necessary under Alternative 2b. Short-term traffic disruptions and noise, which are expected during construction, could possibly affect the Osceola Camp community.

For the Osceola Camp area, noise modeling (Section 2.11) indicates that Alternative 2a, although predicted to exceed FDOT approach criteria, appears to have no impact when compared to future without project conditions. However, Alternative 2b is predicated to exceed FDOT approach criteria and cause impacts beyond the future without project alternative. A noise barrier that would reduce noise to acceptable levels would range in height from 8 to 20 feet over a length of 1,450 feet, and cost $425,000 or $30,360 per residence, which exceeds the FDOT unit cost threshold of $30,000 per benefited residence.

Air quality modeling (Section 5.7.7) indicates that Alternative 2 would have no significant effect on air quality.

This alternative would neither increase nor decrease traffic on the Tamiami Trail. During the construction phase of the project, it may be necessary under some conditions to temporarily close one lane of the highway. Under these situations, signage, signals, and other appropriate traffic controls would be utilized to ensure safety.

The RIMS-2 economic model (Section 5.7.14) indicates that expenditures associated with the construction of Alternative 2a would produce $24,387,038 in new business generated and generate $45,828,122 in wages in the local economy, which would represent approximately 537 man years of employment. Alternative 2b would result in $110,028,397 in new business volume, $30,071,616 in wages, and 1,288 man-years of employment.

Alternative 2 would result in temporary impacts to fishing from the Tamiami Trail right-of-way during construction. Alternative 2b involves a reconstruction of the highway that would eliminate the existing culverts, thus eliminating these spots for fishing. Access to boat ramps would not be affected under this action alternative.

#### 5.7.2.4 Alternative 3. Build New Roadway to the North with Eight New Bridges

The eight bridges associated with this alternative and the breaches in the existing embankment would provide sufficient capacity for conveying MWD flows. The existing culvert system, which extends along the length of the Tamiami Trail in the project area, currently enables a general equalization of flows to ENP that approximates sheet flow. Although the bridges and breaches would be capable of conveying the required amount

of water, the retention of the culvert system under this alternative would assist in maintaining sheet flow.

Under the action alternatives, biological communities would benefit from the abandonment of the existing road (except for access to the Osceola Camp and the Airboat Association of Florida) and its breaching, which would provide hydraulic openings equal to those provided by the bridges of the other alternatives. This action would in turn provide partial connectivity between the L-29 Canal and ENP. Modeling (Section 5.7.5.5) shows that wetland impacts include a loss of 18.82 FUs with Alternative 3a and a loss of 18.82 FUs with Alternative 3b.

As described for Alternative 2, developmental restrictions on threatened and endangered species along the Tamiami Trail were evaluated. Under this alternative, 2,040 linear feet are located in the primary zone and 2,214 linear feet in the secondary zone for the Tamiami West Colony. The only restricted area for the Tamiami East Colony is 2,597 linear feet in the secondary zone. Approximately 817 linear feet of US 41 would be under development restriction for wading birds. Although these restrictions would require phasing of construction, no significant impacts to threatened or endangered species are expected.

Under this action alternative, air quality models (Section 5.7.7) projected that there would be a 4.0 percent increase in CO concentrations in the vicinity of the Tigertail Camp and a future without-project concentration of 4.8 ppm to 5.0 ppm. The NAAQS standard of 9.0 ppm would not be exceeded.

Of the four the cultural resource sites identified, only one, the Tamiami Trail, would be affected under Alternative 3. The existing road would be abandoned, and the embankment would be breached to facilitate flow to ENP.

Aesthetics would be enhanced by Alternative 3, which would provide vistas of the expanse of the Everglades, which, in turn, would be visible to motorists throughout the length of the project area.

The boat access across the L-29 Canal to the Tigertail Camp would be lost. Under Alternative 3, the existing road would be abandoned and boat access would be unnecessary. Access to the Tigertail Camp would be by means of a side road near the camp.

Noise modeling (Section 2.11) indicates that noise levels at the Tigertail Camp would exceed the FDOT approach criteria and cause impacts beyond the future without project alternative. For Alternative 3a, a noise barrier that would reduce noise to acceptable levels would range in height from 8 to 18 feet over a length of 1,130 feet, and cost $465,100 or $77,520 per residence. For Alternative 3b, a noise barrier that would reduce noise to acceptable levels would range in height from 8 to 18 feet over a length of 934 feet, and cost $405,100 or $67,520 per residence. Both alternatives would exceed the FDOT unit cost threshold of $30,000 per benefited residence.

The lands and easements needed to implement the Tamiami Trail modifications are currently under ownership by several individuals. The footprint of Alternative 3 lies just to the north of the L-29 Canal on the north side of the existing roadway and falls within the right-of-way claimed by the SFWMD. Therefore, obtaining fee title ownership form

approximately twenty-four private landowners would be necessary, but would not affect any residential or business improvements. However, in some areas, SFWMD holds only flowage easements and fee title is held by these landowners. Most of the private holdings involve large tracts, but a few are as small as two acres.

Alternative 3 relocates the highway to the north of the L-29 Levee, placing the roadway in the proximity of the Tigertail Camp. Under existing conditions, the Tamiami Trail is 120 feet from the Tigertail Camp; under Alternative 3, the highway would be relocated to 54 feet from the camp. This increased proximity coupled with the elevated nature of the roadway would likely create adverse long-term adverse social (lack of privacy) impacts. Due to the close proximity to the Tigertail Camp, the concept of "disproportionate shares of negative environmental consequences" may apply because impacts to wetlands and other natural resources are minimized while impacts to the Tigertail Camp are increased. It appears that short-term traffic disruptions, noise due to construction, and other potential impacts are sufficiently far enough away to not affect the Osceola Camp community.

Except for disruptions to traffic during construction, no adverse impacts to businesses are expected.

The RIMS-2 economic model (Section 5.7.14) indicates that expenditures associated with the construction of Alternative 3a would produce $127,709,139 in new business generated and generate $34,903,900 in wages in the local economy, which would represent approximately 1,495 man years of employment. Alternative 3b would result in $138,041,086 in new business volume, $37,727,701 in wages, and 1,616 man-years of employment.

Alternative 3 would have adverse impacts on the recreation. Fishing access from the north bank of the L-29 Canal may be impeded during construction. Once the existing roadway is breached, fishing access from the existing roadway would be reduced from 10.5 miles to approximately 8.5 miles. Some of the existing roadbed would remain accessible from the east and west ends of the project and some may be made accessible by bridges to the Airboat Association and to the businesses. Access to boat ramps would remain. Breaches in the existing roadway would allow passage to the L-29 Canal by airboats of the Airboat Association of Florida.

#### 5.7.2.5 Alternative 4. Build New Roadway to the South with Four New Bridges

The four bridges associated with this alternative would provide sufficient hydraulic opening to convey projected MWD Flows.

The four bridges associated with Alternative 4 would provide connectivity between the L-29 Canal and ENP. Installation of the bridges would provide a combined hydraulic opening that would, in turn, provide partial connectivity between ENP and the L-29 Canal. Improving ecological connectivity would enhance aquatic biological communities south of the existing Tamiami Trail. The WRAP model (Section 5.7.5.5) indicates that wetland impacts associated with Alternative 4a include a loss of 40.43 FUs; 64.64 FUs are lost under Alternative 4b.

Like alternatives 2 and 3, developmental restrictions on threatened and endangered species along the Tamiami Trail were evaluated. Under this alternative, 2,763 linear feet

of highway would be constructed in the primary zone and 1,701 linear feet in the secondary zone for the Tamiami West Colony. At the Tamiami East Colony, 3,257 linear feet of highway would be constructed in the secondary zone. There would be 403 linear feet of highway constructed under development restriction for wading birds. Although these restrictions would require phasing of construction, no significant impacts to threatened or endangered species are expected.

Air quality under this alternative was measured using the same guidelines for all other alternatives (Section 5.7.7). Alternative 4 is projected to increase CO concentrations near the Osceola Camp from a future without project concentration of 5.0 ppm to 5.3 ppm (a six percent increase). Again, under this alternative, the NAAQS standard of 9.0 ppm is not exceeded.

Alternative 4 would impact two of the three cultural resources sites. The existing Tamiami Trail roadway and embankment would be relocated. Coopertown Airboat Rides and Restaurant would be severely impacted.

Aesthetics would be enhanced by Alternative 4, which would provide vistas of the expanse of the Everglades throughout the length of the project area.

Noise modeling (Section 2.11) indicates that Alternative 4 would exceed FDOT approach criteria at the Osceola Camp and cause impacts beyond the future without project alternative. For Alternative 4, a noise barrier that would reduce noise to acceptable levels would range in height from 8 to 16 feet over a length of 1,250 feet, and cost $455,500 or $32,500 per residence, which exceeds the FDOT unit cost threshold of $30,000 per benefited residence.

Alternative 4a would extend the right-of-way an additional 50 feet to the south; Alternative 4b would extend it an additional 74 feet. Both, but particularly Alternative 4b, would seriously impact the Osceola Camp, the Airboat Association of Florida, and the three businesses. The loss of facilities resulting from Alternative 4b would likely result in the closing of some of the businesses.

The lands and easements needed to implement the Tamiami Trail modifications are currently under ownership by several individuals. The footprint of this alternative lies just south of the existing roadway and would affect some facilities at the businesses and the Airboat Association. This would require relocation payments as specified under the provision of Title II of Public Law 91-646, The Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended.

The RIMS-2 economic model (Section 5.7.14) indicates that expenditures associated with the construction of Alternative 4a would produce $85,005,819 in new business generated and generate $23,232,751 in wages in the local economy, which would represent approximately 995 man years of employment. Alternative 4b would result in $88,563,761 in new business volume, $24,205,164 in wages, and 1,037 man-years of employment.

Fishing access from the Tamiami Trail to the L-29 Canal would be temporarily impacted during construction. Fishing at culvert outfalls would be eliminated. However, bank fishing opportunities may be enhanced somewhat by providing fishing under shelter of the bridges.

### 5.7.2.6 Alternative 5. Elevated Roadway within Existing Right-of-Way

The 10.7-mile bridge associated with this alternative would provide adequate capacity to convey projected MWD Flows. Under Alternatives 5a and 5b, effects on water management and biological communities would be similar those discussed under other alternatives. Alternative 5c, however, which includes the removal of the existing embankment, would provide for a much greater degree of ecological benefit.

The WRAP model (Section 5.7.5.5) indicates that Alternative 5c would result in significant wetland functional gains of +45.27 FUs. There would be no damage to wetlands associated with this alternative. Under Alternative 5b, wetland functional units are increased by slightly over 41 percent (29.54 FUs). Alternative 5a shows an increase in wetland functional gains of 39.35 FUs. DOI-24

Removal of the highway and embankment associated with Alternative 5c would enhance ecological connectivity, promote sheet flow of water, and allow for the restoration of 66 acres of wetlands.

Effects on threatened and endangered species were evaluated. Primary and secondary zones were established for the Tamiami West wood stork colony, the Tamiami East wood stork colony, and the Frog City wading bird colony. The USFWS has developed restrictions primarily on highway construction and human activity in these zones for periods ranging from 18 to 48 months. Currently, under Alternative 5, 2,295 linear feet of US 41 is located in the primary zone and 2,122 linear feet in the secondary zone for the Tamiami West Colony. The only restricted area for the Tamiami East Colony is 3,123 linear feet in the secondary zone. Furthermore, the small colony of wading birds located in Frog City is situated in WCA-3B close to the L-29 Levee, approximately one-quarter mile west of the Tigertail Camp. This small willow head supports nesting by tricolored herons and great egrets. A buffer zone of 125 meters (410 feet) was established to prevent human disturbances during nesting season and periods where wading birds are roosting at the colony site. Under Alternative 5, 449 linear feet would be under development restriction for wading birds. Although these restrictions would require phasing of construction, no significant impacts to threatened or endangered species are expected.

Air quality under this alternative was measured using the same guidelines for all other alternatives (Section 5.7.7). Alternative 5 would not adversely impact the study area.

The cultural resource survey resulted in the identification of four newly recorded sites. Like all other alternatives, Alternative 5 would bridge or breach portions of the existing

Tamiami Trail to facilitate flow from the L-29 Canal to ENP. In addition, Alternative 5 would encroach slightly on the L-29 Canal.

Under this alternative, because the right-of-way would not be extended closer to either the Osceola or Tigertail camps, there would be no potentially disproportionate impacts related to environmental justice or impacts on children.

Aesthetics would be enhanced by Alternative 5, which would provide vistas of the expanse of the Everglades throughout the length of the project area.

Noise modeling (Section 2.11) indicates that Alternative 5 would result in no significant effects in the project area.

Alternative 5 would result in relatively minor impacts on the Osceola Camp, the Airboat Association of Florida, and the three airboat tour businesses. The footprints under Alternative 5 fall within the maintenance right-of-way for the existing roadway and ownership claimed by FDOT; therefore, no relocations would be required. Access would be provided to the Osceola and Tigertail camps, the Airboat Association of Florida, and the businesses.

The RIMS-2 economic model (Section 5.7.14) indicates that expenditures associated with the construction of Alternative 5a would produce $255,411,468 in new business generated and generate $69,805,939 in wages in the local economy, which would represent approximately 2,990 man years of employment. Alternative 5b would result in $263,678,069 in new business volume, $72,065,265 in wages, and 3,087 man-years of employment. Alternative 5c would result in $267,140,871 in new business volume, $73,011,681 in wages, and 3,127 man-years of employment.

Recreation, particularly access to boat ramps, would be maintained. Alternative 5 would generally eliminate fishing access from the existing Tamiami Trail right-of-way. Short segments of the existing roadway would be accessible at the east and west ends of the project area. Access bridges to the Airboat Association of Florida property and to the existing businesses would also allow access to some portions of the existing roadway between the breaches. Access to the L-29 Canal by airboats from the Airboat Association of Florida would not be provided; the height of the bridge (elevation 14 feet) would be insufficient to allow access by most airboats.

#### 5.7.2.7 Alternative 6. Existing Alignment with Four-Mile Bridge

The four-mile bridge associated with this alternative would provide sufficient hydraulic opening to convey projected MWD Flows. The existing culvert system, which extends along the length of the Tamiami Trail in the project area, currently enables a general equalization of flows to ENP that approximates sheet flow. Although the bridge and breaches would be capable of conveying the required amount of water, the retention of the culvert system under Alternative 6a would assist in maintaining sheet flow.

The four-mile bridge would provide connectivity between the L-29 Canal and ENP. The bridge would provide a hydraulic opening that would provide partial connectivity between ENP and the L-29 Canal. Improving ecological connectivity would enhance aquatic biological communities south of the existing Tamiami Trail.

WRAP modeling (Section 5.7.5.5) indicates that wetland impacts associated with Alternative 6a include a loss of 1.91 FUs; 33.36 FUs are lost under Alternative 6b.

Effects on threatened and endangered species were evaluated. Primary and secondary zones were established for the Tamiami West wood stork colony, the Tamiami East wood stork colony, and the Frog City wading bird colony. The USFWS has developed restrictions primarily on highway construction and human activity in these zones for periods ranging from 18 to 48 months. Currently, under Alternative 6, 2,295 linear feet of US 41 is located in the primary zone and 2,122 linear feet in the secondary zone for

the Tamiami West Colony. The only restricted area for the Tamiami East Colony would be 3,123 linear feet in the secondary zone. Furthermore, the small colony of wading birds located in Frog City is situated in WCA-3B close to the L-29 Levee, approximately one-quarter mile west of the Tigertail Camp. This small willow head supports nesting by tricolored herons and great egrets. A buffer zone of 125 meters (410 feet) was established to prevent human disturbances during nesting season and periods where wading birds are roosting at the colony site. Under Alternative 6, 449 linear feet would be under development restriction for wading birds. Although these restrictions would require phasing of construction, no significant impacts to threatened or endangered species are expected.

Air quality modeling (Section 5.7.7) indicates that Alternative 6 would have no significant effect on air quality.

Alternative 6a would involve modification of the Tamiami Trail, but would not impact any of the other identified cultural resources. Alternative 6b would involve a reconstruction of the Tamiami Trail, and severely impact Coopertown Airboat Rides and Restaurant: two structures and the boat dock would be lost.

Aesthetics would be enhanced by the removal of exotic vegetation on the southern side of the Tamiami Trail, which is necessary for the modifications and reconstruction under this action alternative.

Alternative 6a would result in relatively minor impacts on the Osceola Camp, the Airboat Association of Florida, and the three airboat tour businesses. Alternative 6b would create significant adverse impacts. The footprint of Alternative 6a falls within the maintenance right-of-way for the existing roadway and ownership claimed by FDOT; therefore, no relocations would be required. Relocations may be necessary under Alternative 6b. Short-term traffic disruptions and noise, which are expected during construction, could possibly affect the Osceola Camp community.

For the Osceola Camp area, noise modeling (Section 2.11) indicates that Alternative 6a, although predicted to exceed FDOT approach criteria, appears to have no impact when compared to future without project conditions. However, Alternative 6b is predicated to exceed FDOT approach criteria and cause impacts beyond the future without project alternative. A noise barrier that would reduce noise to acceptable levels would range in height from 8 to 20 feet over a length of 1,450 feet, and cost $425,000 or $30,360 per residence, which exceeds the FDOT unit cost threshold of $30,000 per benefited residence.

This alternative would neither increase nor decrease traffic on the Tamiami Trail. The existing boat access across the L-29 Canal to the Tigertail Camp would be retained except possibly for temporary durations during the construction period when shoulders, currently used for parking, would be used for travel lanes. Access to the camp using the unimproved road along the L-29 Levee would continue.

The RIMS-2 economic model (Section 5.7.14) indicates that expenditures associated with the construction of Alternative 6a would produce $136,952,298 in new business generated and generate $37,430,127 in wages in the local economy, which would represent approximately 1,603 man years of employment. Alternative 6b would result in

$152,909,897 in new business volume, $41,791,463 in wages, and 1,790 man-years of employment.

Alternative 6 would result in temporary impacts to fishing from the Tamiami Trail right-of-way during construction. Alternative 6b involves a reconstruction of the highway that would eliminate the existing culverts, thus eliminating these spots for fishing. Access to boat ramps would not be affected under this alternative. Access to the L-29 Canal by airboats from the Airboat Association of Florida would not be provided; the height of the bridge (elevation 14 feet) would be insufficient to allow access by most airboats.

### 5.7.2.8 Alternative 7. Existing Alignment with 3,000-foot Bridge

The 3,000-foot bridge associated with this alternative would provide sufficient hydraulic opening to convey projected MWD Flows. The existing culvert system, which extends along the length of the Tamiami Trail in the project area, currently enables a general equalization of flows to ENP that approximates sheet flow. Although the opening would be capable of conveying the required amount of water, the retention of the culvert system under Alternative 7a would assist in maintaining sheet flow.

The hydraulic opening of the 3,000-foot bridge would provide approximately five percent of the connectivity between the L-29 Canal and ENP in the 10.7-mile project area. The bridge would provide a hydraulic opening that would provide partial connectivity between ENP and the L-29 Canal. Improving ecological connectivity would enhance aquatic biological communities south of the existing Tamiami Trail. FPB-9

WRAP modeling (Section 5.7.5.5) indicates that wetland impacts associated with Alternative 7a would include a loss of 3.42 FUs; 49.55 FUs would be lost under Alternative 7b.

Effects on threatened and endangered species were evaluated. Primary and secondary zones were established for the Tamiami West wood stork colony, the Tamiami East wood stork colony, and the Frog City wading bird colony. The USFWS has developed restrictions primarily on highway construction and human activity in these zones for periods ranging from 18 to 48 months. Under Alternative 7, 2,295 linear feet of US 41would be located in the primary zone and 2,122 linear feet in the secondary zone for the Tamiami West Colony. The only restricted area for the Tamiami East Colony is 3,123 linear feet in the secondary zone. Furthermore, the small colony of wading birds located in Frog City is situated in WCA-3B close to the L-29 Levee, approximately one-quarter mile west of the Tigertail Camp. This small willow head supports nesting by tricolored herons and great egrets. A buffer zone of 125 meters (410 feet) was established to prevent human disturbances during nesting season and periods where wading birds are roosting at the colony site. Under Alternative 7, 449 linear feet would be under development restriction for wading birds. Although these restrictions would require phasing of construction, no significant impacts to threatened or endangered species are expected.

Air quality modeling (Section 5.7.7) indicates that Alternative 7 would have no significant effect on air quality.

Alternative 7a would involve modification of the Tamiami Trail, but would not impact any of the other identified cultural resources. Alternative 7b would involve a reconstruction of

the Tamiami Trail, and severely impact Coopertown Airboat Rides and Restaurant: two structures and the boat dock would be lost.

Aesthetics would be enhanced by the removal of exotic vegetation on the southern side of the Tamiami Trail, which is necessary for the modifications and reconstruction under this action alternative.

Alternative 7a would result in relatively minor impacts on the Osceola Camp, the Airboat Association of Florida, and the three airboat tour businesses. Alternative 7b would create significant adverse impacts. The footprint of Alternative 7a falls within the maintenance right-of-way for the existing roadway and ownership claimed by FDOT; therefore, no relocations would be required. Relocations may be necessary under Alternative 7b. Short-term traffic disruptions and noise, which are expected during construction, could possibly affect the Osceola Camp community.

For the Osceola Camp area, noise modeling (Section 2.11) indicates that Alternative 7a, although predicted to exceed FDOT approach criteria, appears to have no impact when compared to future without project conditions. However, Alternative 7b is predicated to exceed FDOT approach criteria and cause impacts beyond the future without project alternative. A noise barrier that would reduce noise to acceptable levels would range in height from 8 to 20 feet over a length of 1,450 feet, and cost $425,000 or $30,360 per residence, which exceeds the FDOT unit cost threshold of $30,000 per benefited residence.

This alternative would neither increase nor decrease traffic on the Tamiami Trail. The existing boat access across the L-29 Canal to the Tigertail Camp would be retained except possibly for temporary durations during the construction period when shoulders, currently used for parking, would be used for travel lanes. Access to the camp using the unimproved road along the L-29 Levee would continue.

The RIMS-2 economic model (Section 5.7.14) indicates that expenditures associated with the construction of Alternative 7a would produce $43,307,541 in new business generated and generate $11,836,288 in wages in the local economy, which would represent approximately 507 man years of employment. Alternative 7b would result in $97,452,277 in new business volume, $26,634,465 in wages, and 1,141 man-years of employment.

Alternative 7 would result in temporary impacts to fishing from the Tamiami Trail right-of-way during construction. Alternative 7b involves a reconstruction of the highway that would eliminate the existing culverts, thus eliminating these spots for fishing. Access to boat ramps, would not be affected under this alternative. Access to the L-29 Canal by airboats from the Airboat Association of Florida would not be provided; the height of the bridge (elevation 14 feet) would be insufficient to allow access by most airboats.

#### 5.7.2.9 Alternative 8. Existing Alignment with Raised Profile and Box Culverts

The series of box culverts associated with this alternative would provide sufficient hydraulic opening to convey projected MWD Flows. The existing culvert system, which extends along the length of the Tamiami Trail in the project area, currently enables a general equalization of flows to ENP that approximates sheet flow. Although the new

culverts would be capable of conveying the required amount of water, the retention of the existing culvert system under Alternative 7a would assist in maintaining sheet flow.

The culverts would provide some connectivity between the L-29 Canal and ENP. The hydraulic opening would provide partial connectivity between ENP and the L-29 Canal. Improving ecological connectivity would enhance aquatic biological communities south of the existing Tamiami Trail.

WPAP modeling (Section 5.7.5.5) indicates that wetland impacts associated with Alternative 8a include a loss of 3.51 FUs; 46.56 FUs are lost under Alternative 8b.

Effects on threatened and endangered species were evaluated. Primary and secondary zones were established for the Tamiami West wood stork colony, the Tamiami East wood stork colony, and the Frog City wading bird colony. The USFWS has developed restrictions primarily on highway construction and human activity in these zones for periods ranging from 18 to 48 months. Under Alternative 8, 2,295 linear feet of US 41 would be located in the primary zone and 2,122 linear feet in the secondary zone for the Tamiami West Colony. The only restricted area for the Tamiami East Colony is 3,123 linear feet in the secondary zone. Furthermore, the small colony of wading birds located in Frog City is situated in WCA-3B close to the L-29 Levee, approximately one-quarter mile west of the Tigertail Camp. This small willow head supports nesting by tricolored herons and great egrets. A buffer zone of 125 meters (410 feet) was established to prevent human disturbances during nesting season and periods where wading birds are roosting at the colony site. Under Alternative 8, 449 linear feet would be under development restriction for wading birds. Although these restrictions would require phasing of construction, no significant impacts to threatened or endangered species are expected.

Air quality modeling (Section 5.7.7) indicates that Alternative 8 would have no significant effect on air quality.

Alternative 8a would involve modification of the Tamiami Trail, but would not impact any of the other identified cultural resources. Alternative 8b would involve a reconstruction of the Tamiami Trail, and severely impact Coopertown Airboat Rides and Restaurant: two structures and the boat dock would be lost.

Aesthetics would be enhanced by the removal of exotic vegetation on the southern side of the Tamiami Trail, which is necessary for the modifications and reconstruction under this action alternative.

Alternative 8a would result in relatively minor impacts on the Osceola Camp, the Airboat Association of Florida, and the three airboat tour businesses. Alternative 8b would create significant adverse impacts. The footprint of Alternative 8a falls within the maintenance right-of-way for the existing roadway and ownership claimed by FDOT; therefore, no relocations would be required. Relocations may be necessary under Alternative 8b. Short-term traffic disruptions and noise, which are expected during construction, could possibly affect the Osceola Camp community.

For the Osceola Camp area, noise modeling (Section 2.11) indicates that Alternative 8a, although predicted to exceed FDOT approach criteria, appears to have no impact when compared to future without project conditions. However, Alternative 8b is predicated to

exceed FDOT approach criteria and cause impacts beyond the future without project alternative. A noise barrier that would reduce noise to acceptable levels would range in height from 8 to 20 feet over a length of 1,450 feet, and cost $425,000 or $30,360 per residence, which exceeds the FDOT unit cost threshold of $30,000 per benefited residence.

This alternative would neither increase nor decrease traffic on the Tamiami Trail. The existing boat access across the L-29 Canal to the Tigertail Camp would be retained except possibly for temporary durations during the construction period when shoulders, currently used for parking, would be used for travel lanes. Access to the camp using the unimproved road along the L-29 Levee would continue.

The RIMS-2 economic model (Section 5.7.14) indicates that expenditures associated with the construction of Alternative 8a would produce $85,503,591 in new business generated and generate $23,368,796 in wages in the local economy, which would represent approximately 1,001 man years of employment. Alternative 8b would result in $88,474,670 in new business volume, $24,180,815 in wages, and 1,036 man-years of employment.

Alternative 8 would result in temporary impacts to fishing from the Tamiami Trail right-of-way during construction. Alternative 8b involves a reconstruction of the highway that would eliminate the existing culverts, thus eliminating these spots for fishing. Access to boat ramps, would not be affected under this alternative.